NATURE MAGAZINE

JULY 1925

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MAGIC EYES

that multiply the pleasures of hobby and sport

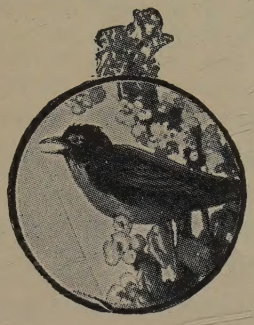
HOW glorious it would be if your eyes would become twelve times more powerful! The sensation would be as thrilling as the discovery of a new world. And you *would* discover a new world—far more beautiful, far more fascinating than you ever dreamed this Earth could be!

Today you are shut inside a mile-wide circle, outside of which everything blends into a formless haze. For you know, of course, that even on the clearest day and under the most favoring conditions the unaided eye of men cannot distinguish the shape, size or color of any object more than one mile distant.

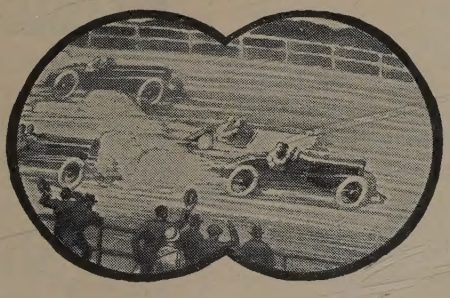
But if your eyes were twelve times stronger you would leap across the narrow limits of your present vision and open to your sight a mighty circle of over 450 square miles in area—more than one-third of the State of Rhode Island.

Do You Know the Colors of the Stars?

Every object in this enormous area would be clear and distinct. Landscapes would reveal their marvelous colors and tints. Miles up in the sky you could follow the majestic eagle swooping through the air on motionless wings. The myriad stars of heaven no longer would be merely flickering pin-pricks of light. You would see them in their varying tints—red, blue, yellow, purple, crimson, silver-gray. You could see the rings of Saturn and the four moons of Jupiter.



You know that whatever your hobby or sport, it is the things that you *see* (as much as what you do) that bring you joy and happiness. How much greater then your enjoyment can be if you increase your range of vision. Motor touring would open to you new vistas of rare and enchanting beauty. On your hikes you could see more of the things—see them more closely and more intimately — that make your walks pleasurable. If you love nature think what it would mean to see at close range the rare and shy birds and animals that you can never see today. If you follow outdoor sports: horse-racing, golfing, yachting, baseball; how more fascinating these sports can be if you could see at close range every movement of the objects you follow so closely.



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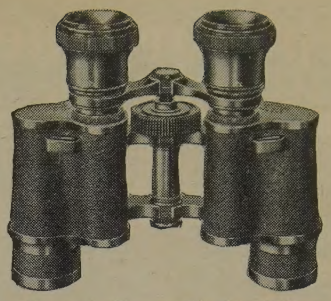

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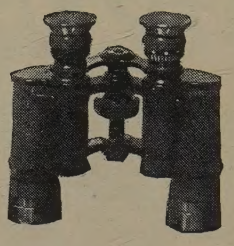

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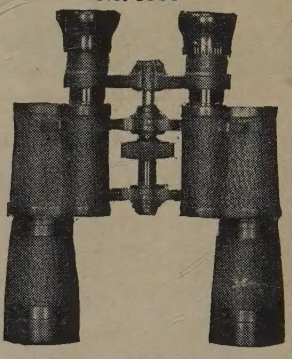

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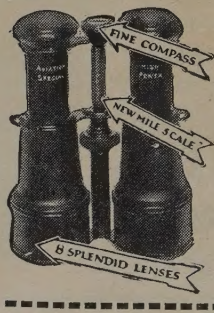

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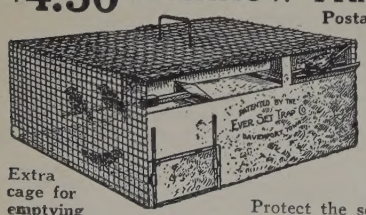

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Guide to the Trees

In content equipped with concise material, descriptive drawings and a complete key, and in physical shape designed for the pocket, "A Guide to the Trees," written by Prof. Carlton C. Curtis of Columbia University and published by Greenberg, Inc., New York, is both a handy and valuable volume. This little volume is for the average person interested in trees, the Boy or Girl Scout, the camper and the amateur botanist. It is simple yet complete in the section of the country it seeks to cover, namely, the east and the central west. The book testifies to the greatest care in compilation and boasts a short key by means of which any tree may be quickly classified without difficulty. Its authenticity and value are enhanced by the reputation of its author, whose "General Textbook of Botany" and "The Nature and Development of Plants" are virtually standard works.

Shala's Peaks

In the mountains of Albania live tribes existing under primitive conditions, ruled by a law code of ancient lineage, struggling to turn scant endowments by Nature into livelihood. Mrs. Rose Wilder Lane is one of the few foreign women who have penetrated these fastnesses and she tells of her visit in a volume, "The Peaks of Shala," published by Harper and Brothers, New York. If all fiction could be as interesting and as fascinatingly written as this book of travel-adventure it would be a happier world. Deft to a great degree with her pen, Mrs. Lane infuses her story with a humanity, a comprehension and a breadth of viewpoint that makes it truly live. We are only sorry that she felt an attack of pneumonia coming on from the heavy rains and felt forced to turn back. Had she not we might have had several such volumes.

Sun Brothers

Adapting a style that made him stand out in the field of fiction to a treatment of Nature subjects, Henry Williamson, a young Englishman, has furnished a fine piece of work in "Sun Brothers," published by E. P. Dutton and Company, New York. The first story in the book is of Li'l Jearge, none other than a little mouse with an inferiority complex. It makes you want to throw away your mouse-trap. The same delicacy and affection of treatment endures in the subsequent stories, making their wild life and animal subjects live, without endowing them with unreality such as inept writers are apt to do when undertaking this method of treatment.

For Nature Students

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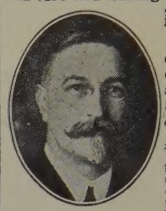

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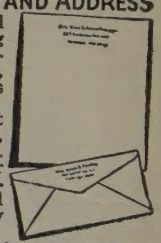

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For the Young People

L. C. Page and Company of Boston deerves the applause it will undoubtedly reeive for the publication in standard form f seven Nature volumes for young people. The set in question are the stories of trees, lowers, insects, birds, little fishes, little nimals and big animals from the pen of Lenore E. Mulets. These are new editions f Children's Nature books that have stood he test of time and merit the attractive orm in which they are now reproduced. The stories themselves are written in simple nd entertaining narrative form, interpersed with verse, here and there. With the apid spread of Nature study in the schools, even beginning with the kindergarten, these ooks provide excellent correlative reading, olving a problem for parents and satisfying need for the youngsters.

Pennsylvania Trees

Joseph S. Illick of the Pennsylvania Department of Forestry has added to his achievements in presenting tree facts in attractive and comprehensible form in a handy pocket manual entitled "Common Trees of Pennsylvania," printed and distributed by the Times Tribune Publishing Company, of Altoona, Pennsylvania. This manual was prepared at the special request of Boy and Girl Scout leaders and outdoor workers and should amply fill their most insistent demands for a working volume. It prefaces the descriptive material—which is illustrated —by general instructions leading to tree study. Mr. Illick is known for several tree books, one of the most recent of which is "Tree Habits," published by the American Tree Association.

First Day of a Tramp

"The first day of a long tramp is often not the sweetest. Either the shoes do not fit to a nicety or the straps gall and the pack is not well balanced—and one always wears too many clothes." So says Charles Coleman Stoddard in his book entitled "Shanks' Mare," published by Doran. "But more trying even than tender feet or other physical discomforts is the difficulty of mental adjustment. Impressions are then the keenest; and the newness and variety of these impressions, without the power to judge and classify them, beat upon the eye and brain in multitudinous confusion. It is a sharp change of focus, not alone for the eye, but for the whole being, from the narrow walls of the city and the counting room to the vast, changing panorama of hill and field, sky and river. The mind does not easily break away from the beaten path of habit. There is still the attempt to bridge back; a reluctance in casting aside the old standards, an effort to shape the new world to artificial criterions."

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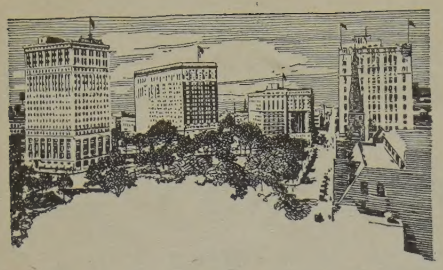

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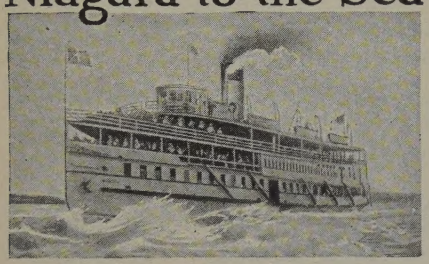

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Trees, Man's Friends

"Trees are Man's greatest friends," says James Berthold Berry, M.S., in his book, "Northern Woodlot Trees," published by the World Book Company. "They supply him with food and shelter; they conserve water power and preserve the soil; they soften the climate for God's creatures; they inspire holy and beautiful thoughts. Without trees the land becomes inhospitable and unkind, and civilization disintegrates. No greater lesson can be taught by our schools than the creation of a personal, growing affection for our tree friends."

Aunt Chloe

From the Piedmont Publishing Company, of Lynchburg, Virginia, and the pen of William Edgar Thompson comes an interesting Nature volume of a different sort. It is, we understand, the first of several, being entitled, "Aunt Chloe and Her Birds." It is a collection of seven bird stories covering the Baltimore oriole, turtle dove, blue jay, cat bird, owl, crane and crow. They are told in Negro dialect by Aunt Chloe to the children who gather about her to hear her Nature lore. We are told by those who should know that the dialect is excellent, and we understand that it is hoped to correct by it some of the lesser accurate dialect that appears in some current fiction. Into the narratives are woven some quaint philosophy as well as entertaining Nature tales. It is illustrated by several color plates, which might be better, and which the publisher says are going to be so in subsequent editions and forthcoming volumes.

Jimmy the Bear Cub

"Of course Jimmie was a favorite with every child in the neighborhood, and if a children's vote had been taken for the most popular animal in our country, I believe that the bear cub would have been unanimously elected," says Ernest Harold Baynes in his book, "The Story of a Black Bear Cub," published by Macmillan. "To be sure if the grown people had held the election, there might have been some votes against him. But the kiddies loved him. He was one of them, and they understood him. They enjoyed his mischievous pranks, and he would play as long as any of them cared to play with him.

"At Christmas we gave a children's party, and perhaps a score of girls and boys came to spend the evening. As it was not possible to make Jimmie understand about the party, he went to bed early, as usual, and was asleep in his own den under the piazza long before the first guests arrived. He was not forgotten by his little friends, however, and 'Where's Jimmie?' was the first question asked by almost every child that came in."

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Vultures Are Scavengers

"Vultures are the feathered scavengers of Nature," says F. W. Fitzsimmons in his "Natural History of South Africa;" Birds, Vol. I, published by Longmans, Green & Co. "Their mission in life is to eat up the dead bodies of animals which, if allowed to rot away, would poison the atmosphere and sow disease microbes broadcast. The diseased flesh, when swallowed by a vulture, is rapidly digested, and all the harmful bacteria are destroyed by its gastric juices. In the past, before the advent of man into South Africa, the vulture (Aas Vogel) and the white-necked raven (Ring-hals) rendered sterling service in keeping disease epidemics in check. When a plague broke out in a herd of antelopes, for instance, the vultures and ravens gathered in thousands, ate up the victims, and left only the bones and spashes of blood which the bright South African sun rapidly sterilized. In this way epidemics of disease were checked, and the animals of the country saved from utter destruction.

"During the many terrible epidemics of disease which have swept the stock farmers' flocks and herds, the vultures and ravens rendered valuable services in devouring the carcasses with which the veld and hillsides were strewn. That terrible scourge of the stock farmer, gal-lamziekte, has been shown to be due to cattle eating bones with dry, rotten flesh on them, and also to bones of animals whose bodies have decayed. By eating the flesh and picking the bones clean these birds reduce the prevalence of this disease."

Rocks and Minerals

"Why should one be interested in rocks and minerals? Because the whole world is made of rocks and minerals," says Frederic Brewster Loomis, in his book, Field Book of Common Rocks and Minerals, published by G. P. Putnam's Sons, New York. "They are the foundations on which we build. From them we draw all our metals, and the extent to which we utilize our minerals is a measure of the advance of our civilization. Fragments of rock are the soil from which, by way of the plants, we draw our food, and ultimately our life. The rocks make wild or gentle scenery, one at least of the sources of pleasure. Knowledge of rocks and minerals is then knowledge of fundamentals, of ultimate sources. Between finding the raw materials and their present uses there are usually many steps (so many that we forget that the beginning and end are united), as for instance in your watch. Then, too, there is joy in going out into Nature's wild and raw places, joy in being on the foundations of the earth, joy in the scenery, in the beauty of the minerals themselves."

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Nature Calendar

JULY

"The smell of the morning that lurks in the hay,
The swish of the scythe
And the roundelay
Of the meadow-lark as he wings away,
Are the joys of the summer morning.

"The daisy's bloom on the meadow's breast
The wandering bee
And his ceaseless quest
Of the tempting sweets of the clover's crest,
Are the joys of the summer morning."

—*Henry A. Wise Wood.*

The sweet song of the meadowlark in the early morning is a cheery prelude for the midsummer day.

This is a time when young birds are in evidence everywhere. In your walk afield you may see some trying their wings, attended by anxious parents.

With one brood raised and self-supporting, bluebirds are now busy with a second family.

Even after young orioles have left their nests their call will bring fond parents to them with food.

Yellow warbler fledgings are ready to leave their parents and shift for themselves.

Kingfishers must make bigger catches now. There are young in the nest to feed.

Birds are feasting on currant and cherry crops. They soon make "clean pickings."

Broad-spreading flat clusters of white blossoms now cover elderberry bushes.

Tangled blackberry vines are dotted with luscious ripe berries.

Beneath the delicate new green leaves of the wintergreen are waxy white flowers. Thick and dark are the leaves of last year compared with this season's growth.

Familiar to all is the yellow wood sorrel blooming by the roadside.

Great mullein, standing tall and erect like the church spires of a village, adds a picturesque touch to the stony pasture.

Early golden-rod is blooming.

The beautiful white flowering spikes of white snake-root are borne high above the surrounding grasses and vegetation. Do not dull your joy of its beauty by picking or smelling it.

White sweet clover scents the air with its delicate rich fragrance.

Ferns are luxuriant in woodland places. You may find clumps of sensitive ferns with their beautiful fruiting fronds and bunches of maidenhair, beech, New York, marsh, cinnamon, Christmas or lady ferns in moist habitats.

The drowsy hum of bees and insects accentuates the peace and quiet of these July days.

Butterflies of all colors and sizes are numerous everywhere.

At twilight fireflies by the hundreds flash their lemon-green lights over lowlands and marshes.

Have you seen the young larvae of the io moth playing their favorite game of follow-the-leader around the margin of a leaf?

Glow-worms find shelter in old rotting logs in the woods.

Otters are fishermen par excellence. When not engaged in the quest for food they might be found tobogganing. The slippery clay banks of streams make admirable slides into the water.

Early some evening you may come upon a family of young skunks. The young follow behind their mother like a litter of little pigs.

The opossum mother carries her babies in her abdominal pouch as she hunts for food. Her family is large, numbering from seven to nine.

Do you know the value of the toad in your garden? Counting only the cutworms he consumes he may be valued at about nineteen dollars a year if you estimate the damage done by one cutworm at one cent a year.

Prepared for NATURE MAGAZINE by the Cleveland Museum of Natural History

PHOTOGRAPH EDWIN LEVICK, NEW YORK

HOMEWARD BOUND IN THE SARGASSO SEA

NATURE MAGAZINE

Vol. VI JULY, 1925 No. 1

"When we behold the fragrant rose and lily, we see His love and purity. So the green trees and fields, and singing of birds, are the emanation of His infinite joy and benignity."—JONATHAN EDWARDS.

In the Sargasso Sea

By CAPTAIN J. MENANDER

Of the Explorer's Club

MOST people picture the Sargasso Sea as a huge expanse of stagnant water, thickly covered with a tremendous amount of rotting seaweed and dotted with numerous derelicts, some of which are supposed to have drifted on these motionless waters for years, even decades. This accumulation of seaweed is generally supposed to be impenetrable to ships, even almost defying our modern steamers. Thanks largely to fiction writers, the Sargasso Sea is often claimed to be the home of the great sea-serpent and other problematic marine monsters. Not so long ago it was stated by the daily press that Columbus on his voyage of discovery of America was greatly delayed by the seaweed in the Sargasso Sea, and it seems to be generally believed that the weed for days actually stopped the progress of his little flotilla.

The condensed account of Columbus' journey fails to disclose a single instance where the explorer's ships were delayed by the weed. His progress was at times very slow, even for those ancient days, but a study of his abridged log-book distinctly shows that a short "day's run" was invariably caused by calms and light airs. In more than one case the narrative tells us so.

Navarrete's narrative of Columbus' description of the Sargasso Sea is correct, as far as it goes. He mentions on several occasions that fine weather with smooth sea and light breeze prevailed. "There was a real pleasure experienced in enjoying the beauties of the mornings, and there was nothing wanting to it but the warblings of nightingales. The weather was like the month of April in Andalusia." The presence of the weed does not seem to have worried Columbus in the least. In fact he made the easily explained mistake of assuming that the weed indicated vicinity of land.

PHOTOGRAPH N. Y. ZOOLOGICAL SOCIETY

OCCASIONALLY THE SEA-HORSE IS FOUND

It is the only fish with a prehensile and finless tail, equipped for grasping upright growths.

While Columbus was the first known navigator to enter and cross the Sargasso Sea, the existence of great masses of seaweed in the North Atlantic had been known for centuries before his time. Early Portuguese explorers, who at some indeterminable time between the eighth and twelfth centuries set out to cross

the unknown sea to the west of Gibraltar, reported that they had encountered an impenetrable part of the ocean somewhere between the Azores and the Canary Islands, but their tale was grossly exaggerated apparently in their attempt to explain their failure to proceed on their westward journey.

On a map, published in the year 1367 by the Pizigani brothers, is written an earnest warning against attempts to navigate the ocean to the west of the Azores. To emphasize this warning the figure of a saint is depicted on the map with his hand raised as a solemn token of caution.

Columbus' follower, Gonzalo Oviedo (1478–1557) is the first one to use the name Sargasso for the weed (from *sargo,* grape, and *asso,* like), which he describes as being found in "great, green or yellowish meadows." Rumphius in 1699 recognizes the weed as originally growing close to shore. Alexander von Humboldt in 1814 is the first one to give a more detailed and fairly correct description of the Sargasso Sea, but, while he admits that most of the weed comes from the Gulf of Mexico and the Bahama Bank, he thinks that some of it has grown in shallow water on banks which he assumes to exist somewhere within the bounds of the Sargasso Sea.

Mysterious islands and legendary banks were definitely removed from this part of the ocean by Lieut. Samuel P. Lee, in command of the United States Surveying Brig *Dolphin.* Lieutenant Lee's soundings, which were taken in 1851, show there is no probability that any shallow spots will be found within the Sargasso Sea. The depth varies from about two to three thousand fathoms. The temperature of the water ranges from about seventy-five degrees at the surface to thirty-five degrees at the bottom.

The British *Challenger* expedition (1872–1876), the German Plankton Expedition of 1889, and the joint Norwegian-English expedition of 1910 on board the *Michael Sars* have practically solved all questions about this very interesting, but no longer mysterious, part of the ocean. It may be predicted, also, that the present American expedition under William Beebe will add to our accumulated knowledge of marine life in general and of the Sargasso Sea in particular.

PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

THE FLYING FISH

It springs from the water like grasshoppers in a meadow evading enemies.

PHOTOGRAPH N. Y. ZOOLOGICAL SOCIETY

SHRIMPS ARE ABUNDANT

They make the weed their home, taking on similar colorations.

The Sargasso Sea is in fact an immense back eddy or slow whirlpool, formed by the Gulf Stream to the west, by the North Atlantic Drift to the north, by the Canaries Current to the east, and by the North Equatorial Current to the south. It is roughly located between the twentieth and thirty-fifth parallels of north latitude, and it extends from thirty-five degrees westerly longitude to the West Indies and the Gulf Stream. This part of the Atlantic has derived its name from a brown alga or seaweed, the sargassum, also known as gulfweed, sealentils and seagrape, which is more or less frequently met with in the Sargasso Sea, where it floats suspended in the water. Between twenty-five and thirty degrees of latitude and west of the 40th meridian the weed is more common, and here it covers about 10 per cent of the surface.

This area is estimated at approximately 1,700,000 square statute miles, half the size of the United States, exclusive of

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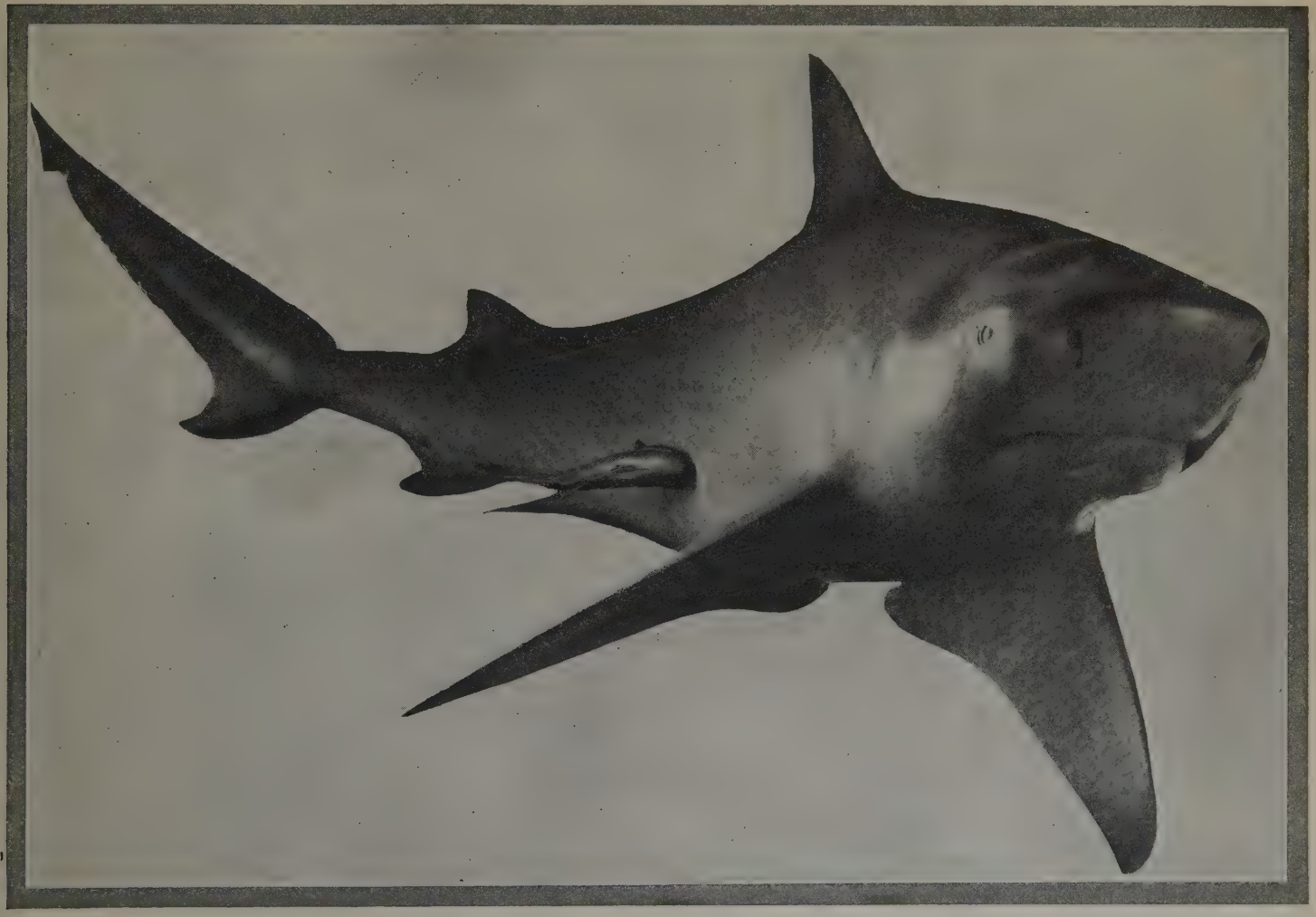
Alaska and outlying possessions. West of the 45th meridian and in about thirty degrees of latitude the weed becomes slightly more frequent, but it is nowhere so thick that there can be any danger of ships being impeded in their progress by the weed. The floating sargassum is occasionally found in patches as large as two to three hundred feet in diameter, but it is generally arranged in bands or streamers, twenty to thirty feet wide and between two to three feet deep. The streamers, which are from two to three hundred feet apart, are running parallel to the direction of the wind. The cause of this arrangement in bands is that the weed partly extends above the water and thus catches the wind. When set in motion by the air-current, some individual plants move faster than others. The branches of a fast-moving plant catch hold of the branches of a slower one and swing round to the leeward of the latter, until the whole mass is strung out in a long ribbon, slowly moving in the direction of the wind. A shift of the wind will disperse the mass, only to form new combinations of bands. The feathery bunches of the weed are not matted together, but the individual plants are floating nearly free of one another.

The gulfweed, which includes two different genera, originally comes from the Caribbean Sea and the Gulf of Mexico, where it grows attached to rocks. The branches of the weed are fitted with numerous air-vessels in the form of globular blisters as large as a pea. When a frond of this plant is broken off by the action of the waves or the tide, it is lifted to the surface by the buoyancy of the air-vessels and carried by the Gulf Stream.

In the floating form of the plant the fronds generally grow out from a central point, from which branches extend in all directions; in such individuals the base appears to be a fragment of a broken branch, and any detached piece of the weed seems to be able to grow into a little floating "bush," one to five feet in diameter. It is remarkable that the floating weed is destitute of the ordinary organs of reproduction, so that while the detached individuals continue to grow vegetatively, the propagation of



PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

FREQUENTLY A SLOW-MOVING AND GRACEFUL SHARK IS SEEN

Attended by its sucker—as shown in the illustration—it wends its way amongst the patches and streamers of weed.

the species is left to individuals that are attached.

The color of the freshly detached plant is olive-yellow, but this color gradually changes into a darker, olive-brown hue, as the drifting plant grows older. The weed is much encrusted by bryozoa, which make conspicuous white patches upon the branches, giving a motley effect to the natural yellow or brown color of the plant.

As the drifting algae grow, the air-bladders are formed in a less proportion than on the attached plants, with the result that one finds newly detached individuals at the surface, with part of their branches slightly protruding out of the water, whereas bushes that have drifted for a longer period and have less buoyancy are found totally submerged. Another reason for the increased specific weight of the older plants is that they gradually become covered with the calcareous shells of the bryozoa, which attach themselves to anything and everything that affords a surface suitable for the purpose. Finally the buoyancy ceases altogether, and the plant sinks into deep water and dies. As the plant breaks up, many of the air-bladders float to the surface, where they are encountered in great numbers. The disintegrating dead plants form debris, which, while sinking towards the bottom, constitutes part of the food of fish and smaller animals that live at the deeper levels of the sea.

PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

SARGASSO FISH AND WEED

This interesting fish sometimes grows to be three inches in length.

It is estimated that a frond of the weed, staying in the current, needs from five to six months to drift from the Bahamas to the extreme opposite limit of the Sargasso Sea,

PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

IN THE DEPTHS OF THE SEA ARE MANY STRANGE FISH

Living in darkness they have developed light-producing means of their own, as have the specimens pictured above.

PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

SHARK AND YOUNG

Tips of back fin and upper lobe of tail of the elder fish can frequently be seen cutting the surface of the water.

southwest of the Azores. The weed keeps afloat for probably a year before it sinks, and drifting bushes of all ages are found mixed together in any part of the sea. The regular habitat of the drifting weed is the Sargasso Sea and the Gulf Stream, but specimens have occasionally been found in the English Channel and in the Mediterranean Sea.

The Sargasso Sea is inhabited by various forms of pelagic animals. An occasional whale may be seen spouting, and schools of porpoises are frequently disporting themselves in their graceful jumps out of the water. In the vicinity of land, turtles are sometimes found sunning themselves on the surface, and the tips of the backfin and of the upper lobe of the tail of a solitary, slow-moving and graceful shark are often seen protruding above the water, as the fish, attended by its followers, the sucker and the shark pilot, wends its way amongst the patches and streamers of the weed in search of its next meal. Schools of flying fish may be seen to spring out of the water, like grasshoppers in a meadow, and volplane away to evade a pursuing enemy, which may be a swift bonito or a darting dorado—the latter also, but erroneously, called dolphin. Jelly fishes are swimming in the open water, and brightly colored Portuguese men-of-war are floating on the surface. The latter are, as a rule, attended by swift little fish that seek protection from the intense rays of the sun in the shade of their larger companion.

The gulfweed has its own characteristic fauna, with special adaptations for a life amongst the weed. The small fishes, the crabs, the shrimps, the naked snails and the worms, which make the weed their permanent home, are of exactly the same shade of yellow as the weed, with white markings upon their bodies to represent the patches of bryozoa on the plant. Columbus specially mentions in his log-book that he, on September 17, 1492, found a little crab living amongst the weed, and he preserved the specimen and brought it back to Spain.

The Sargasso fish, which sometime reaches three inches in length, is found exclusively amongst the gulfweed. Conspicuous as it is, when found free in the water, it has to be searched for when in its proper environments. Not satisfied with adopting a protective coloration, this little fish has developed filaments and processes, growing out from the body, that resemble the fronds of the weed to such an extent that it easily escapes detection by predatory fish and sharp-eyed, always hungry sea-birds. As a result of its continued life amongst the branches of the seaweed, the breast fins of this little creature have developed into arm-like limbs, between which the animal can grasp and hold on to fronds of the weed.

The most peculiar looking of all the species of the weed-fauna is undoubtedly the sea-horse, which, while really belonging to the coast regions, is occasionally found in the Sargasso Sea. It derives its name from the striking manner in which its horse-like head is attached to its neck-like trunk, the outline of the body thus giving it the silhouette of the head and neck of a horse. In addition to the internal skeleton the sea-horse is equipped with a hinged, horny, external shell, which resembles the coat of

arms of a knight of the middle ages. This animal is the only fish with a prehensile and finless tail, with which it can grasp and cling to the stalks of the weed, on which it perches in an upright position. It is a poor swimmer; with the aid of its single dorsal fin, which is put into a rapid waving motion like a lady's fan, it is able to shift short distances from one support to another. The coloration and the protuberances on its body resemble its surroundings, supplying means by which it is able to elude its enemies. The eggs are placed by the female in a brood pouch on the ventral side of the body of the male, where they are carried until they are hatched.

Diversified and numerous as the larger animals and plants of the Sargasso Sea are, they can in no way compete with the minute, often microscopic, animals and plants that live suspended in the water. Modern microscopic research has shown that unicellular plants and minute simple animals are so abundant and prolific in the seas that they stagger all imagination. These diminutive animals and plants, together with the eggs and larvae of fish, and small, often transparent, shrimps and mollusks, that live suspended in the water, have been given the collective name of plankton.

Plankton creatures, though generally invisible to the naked eye, are so numerous that they give the color to the sea. In the Sargasso Sea plankton is most abundant at 150 feet below the surface. During the *Michael Sars* expedition one liter (1.05 quarts) of water, brought up from this depth at the northern edge of the Sargasso Sea, was found to contain 5,718 individuals of exceedingly small plants. Because of their inconceivable number of individuals the plankton creatures play a very important part in Nature's economy. Practically half a dozen forms of microscopic marine plants constitute, directly or indirectly, the basic food of all the animals of the sea. The calcareous shells of dead plankton animals make vast deposits on the bottom of the sea, and chalk has in this way been formed from the solid parts of the plankton of remote geological periods.

Many of the pelagic animals, principally minute shrimps, have the faculty of producing a phosphorescent light. Sometimes during the night the sea, as far as the eye can see, is lighted up with sheets of a weird-looking light, and wherever the water breaks a little on the surface the foam is brilliantly illuminated. At other times the water, where disturbed, is seen to be full of small luminous scintillating specks. When large fish or porpoises dart through the water containing luminous plankton, their bodies are brilliantly illuminated, and their tracks are marked as a trail of fire.

The life of the Sargasso Sea is far from restricted to the surface. Animal life is present at all levels of the sea, and fishes have been brought up from the abysmal depths of the Sargasso Sea, where they live, multiply, and die in darkness. The temperature at the bottom is throughout the year near freezing point, and the pressure of the water is enormous. A deep-sea fish in its normal habitat does, however, no more feels the 2,300 pounds per square inch of a mile of depth of water than we feel the fifteen pounds per square inch of forty miles depth of atmosphere.

Some deep-sea fishes have large eyes to utilize the faint light that filters through to the higher levels and the phosphorescent light farther down, while others have lost the use of their eyes entirely. Various species of deep-sea fishes have developed light-producing organs, which emanate a phosphorescent light. It is characteristic that all fishes with luminous organs have eyes. This home-made light not only enables its generator to see the immediate surroundings, but it may also lure the prey upon which it lives, and it undoubtedly serves to bring individuals of the same species together. Other types of deep-sea fishes have enormous, gaping mouths, equipped with long, sharp teeth, and they are known to devour prey larger than themselves.

When the fresh-water eel of America and Europe has reached maturity, it migrates from its habitat in lakes and rivers to the dark abysses of the western Sargasso Sea to breed and then die. The larvae of this fish, which differ from the adult individuals to such an extent that they, until quite recently, were classified as a different species, return to fresh water immediately after their hatching.

While the Sargasso Sea is inhabited by many interesting and often strange-looking animals, the various expeditions that have worked in this territory have so far failed to discover any surviving specimens of a prehistoric fauna, and the chances that any hereto unknown gigantic monsters will be found either here or in any other part of the seven seas are very remote.

The possibility of meeting floating derelicts is probably smaller in the Sargasso Sea than in the more frequented parts of the ocean, since very few ships enter these waters as compared to the numbers that navigate close to the coast and in the regular ocean routes. Consequently few accidents are liable to happen here. It is admitted that derelicts can keep afloat for a considerable time and that they may be wafted into and remain in the comparatively calm regions of the Sargasso Sea, but ships are very seldom abandoned at sea before they are in a sinking condition. The writer has not been able to find any authentic data that derelicts abound in the Sargasso Sea, and the ones that he has encountered during his thirty years at sea have all been met with in other parts of the ocean.

The Jaguar and the Jungle

By H. E. ANTHONY

(ILLUSTRATED BY A FULL-PAGE INSERT IN COLOR FROM A PAINTING BY R. BRUCE HORSFALL)

NO MATTER how much we are interested in the wild life which is immediately about, we are often even more interested in the animals of distant regions or of foreign lands. The animal we have not seen has a charm and fascination for that very reason alone, and it is only natural that we are ready to believe stories about unknown animals which would be ridiculed if told of the animal neighbors we know. Explorers invariably make especial note of the strange mammals and birds they encounter. When the Americas were first visited by the adventurous English, Spanish and French, the animals found were a constant source of wonder, and nearly all of the early chronicles give entertaining, and sometimes highly amusing, accounts of what the discoverers found. The relation of marvelous animal stories, needless to say, was not original with the people of the fifteen hundreds, nor did it stop with them. Queer tales brought back by travelers still crop out today and serve to whet our curiosity about the mammals of other regions.

PHOTOGRAPH N. Y. ZOOLOGICAL SOCIETY

THE JAGUAR IS A WARY ANIMAL

It is alert and powerful, and hunters are more likely to see the footprints than the animal.

The early Spaniard found some mammals in the new world so like those he had known at home that he gave them the same names and found them possessed of familiar traits. Such beasts as the wolf, the deer, the bear, or the squirrel he met and recognized on sight. But with the peccary, the shaggy, uncouth sloth, the armadillo or the llama it was quite different, and he came to know these creatures slowly through imperfect observation, or rapidly through what the natives told him, which was often far from the truth. Thus one of the generally accepted stories of the monkeys of the Amazon region related that the monkeys crossed small streams by making a chain of themselves and crossing over one another's bodies or swinging pendulum-fashion. Another belief was that the peccary was made bottom-side up and ran about with his abdomen where his back should be because the Spaniards thought that the dor-

PHOTOGRAPH N. Y. ZOOLOGICAL SOCIETY

FAVORITE PREY OF THE JAGUAR

The peccary must look to his life when the great spotted cat is abroad.

sal gland, which lies just under the skin of the back, was the animal's navel. A story which persists today and appears to have the advantage, at least, of quite widespread belief is that the puma or cougar of South America will befriend man when he is attacked by a jaguar and fight the big black and yellow cat off.

Many conflicting notions are held as to whether the jaguar is truly a dangerous animal and will or will not attack man. In southern Brazil, where the jaguar attains his maximum size, it seems to be a well-authenticated fact that he may become a man-eater. Colonel Roosevelt, in his book on South America, "Through the Brazilian Wilderness," believed that, under unusual circumstances, the jaguar might make man his prey. The early accounts of the jaguar nearly all relate that the big spotted cat has decided tastes and preferences and that when he visited the camps of those spending a night in the jungle he always made away with a dog first, if one were present. If he could not find a dog his next choice was an Indian, but if no Indians were in the camp he carried off a Spaniard. However, the jaguar of northern South America and Central America has not such a bad reputation as his Brazilian neighbor, although he is a strong, powerful animal nevertheless. I have found that the jaguar is a very wary mammal, and the hunter is lucky indeed to glimpse one. My sole experience with the jaguar, aside from seeing his big footprints after a rain, took place under rather exceptional circumstances.

PHOTOGRAPH N. Y. ZOOLOGICAL SOCIETY

PECCARY, OLD AND YOUNG

An old belief was that the peccary was made bottom-side up.

I was hunting with a native, a West Indian negro, along the shores of Gatun Lake in Panama. I carried a 16-gauge shotgun and was after specimens for the American Museum of Natural History. We went slowly through the heavy forest (the jungle is very dense in this region), watching closely and stopping every few feet to listen for anything that might be stirring. At one place, I remember, the conditions seemed ideal for the agouti, which is a large, long-legged, tailless rodent, somewhat similar in size and build to our western jack-rabbits. My guide said he could call them and tried to do so. He tore a slender strip from a large thin leaf, a leaf

PHOTOGRAPH N. Y. ZOOLOGICAL SOCIETY

A MAN-EATER OR NOT?

Opinions conflict, but in southern Brazil the Jaguar grows largest and is known to attack man.

of the plantainillo, which is very much like the banana, and placed the tip between the palms of his hands, keeping the bit of leaf taut with his thumbs just as boys hold blades of grass to make squawking noises. He, too, made a harsh squawking sound, and we waited and squawked, waited and squawked, trying to deceive the poor agoutis, but had no success. In the north I have called snowshoe hares right up to me by squeaking on the back of my hand so I have little doubt that my guide told the truth when he said he could equally well call up agoutis.

The jungle was very still that morning and we saw not even a squirrel. We were following a dim trail which had been cut through the tangled vegetation and came to a more open locality where we thought we could smell peccary. The peccary has a pronounced musky odor which comes from the gland on its back, and it is not at all unusual to smell one even when it is some distance off. The peccary of this region is the collared peccary, a piglike creature, forty or fifty pounds in weight, which often goes in small bands. Try as we would, we could neither hear nor see any peccary. We finally went on along the trail, concluding that the animals had passed so far beyond that it was useless to strike off into the jungle after them. Eventually we gave up hope of shooting anything that morning and started to return along the trail to the lake, retracing our steps by the place where we had smelled the peccary.

FACE OF THE VAMPIRE BAT

He lives on fluid blood alone, sinking its razor-sharp teeth into the victim.

Suddenly we heard an animal running over the leaves. The pattering was hurried and sounded as if something of good size was headed directly for where we stood. Almost as soon as my ear had caught the approach of the animal, I saw a peccary coming full speed through the cover. He was running as nimbly as a rabbit, doubling around obstacles in his path and scooting through the brush with great agility. My first thought was that we had walked into a band of peccaries and frightened them into a rush to escape. I marvelled, therefore, that the animal seemed to pay no attention to us as we stood in plain sight in the trail. I saw that his course, unless he changed it, would bring him across the trail we had just walked down. Thinking that he would pass quite close to us, I waited for my shot until he should come out of the brush. The peccary flashed out of the heavy growth into the trail, going away from where we stood, and I snapped one barrel of the shotgun at him when he came into the open. Down he went and immediately began to clash and snap his tusks, so my one thought was to run up before he got away. When I turned about after making certain of my specimen, I saw my negro strangely pale and greatly excited. He had just looked into the face of a large jaguar. I turned about too late, for the big cat slipped out of sight into the brush before I could get a shot. What had happened while my back was turned was this.

The jaguar had evidently stalked the peccary, a favorite prey, and got between the peccary and his companions. The peccary was fleeing for his life and cared only for the jaguar behind him. He probably did not see us and would have paid little attention to us if he had. The jaguar was right behind his prey, and if I had not been so intent on securing the peccary I must have seen him in time for a shot. I can imagine that the temper of the cat was not improved by seeing its intended victim fall to a man, but he apparently did not care to attack us. In thinking it over afterward, I have wondered if, had he attacked, he would have lived up to the stories told of him and carried off the native first. At any rate, the native was between me and the jaguar!

As an illustration of the occasional temper of the cougar, or mountain lion, I recently heard an account from reliable sources. An engineer, with a companion, was traveling in the jungle of Venezuela. They stopped to rest near the bank of a stream and were seated with their backs to the forest. A cougar walked out and, unseen by the men, came directly up to them. The big cat put his left paw over the shoulder of the engineer, not roughly, although I believe there was a slight scratch to show for it afterward. Needless to say, the engineer received a tremendous surprise and both men leaped to their feet and yelled. It was now the cougar's turn to be surprised, and he ran back into the jungle. Seemingly the cougar was just curious, in a good-natured sort of way, and wanted to investigate the visitors. Had he been possessed of malicious designs he could have easily hurt one or both men and would have done so when he put his paw on the engineer's shoulder. I could extend this account of the cougar's good nature —at certain times at least—by several additional stories, but will refer the interested reader to Hudson's "Naturalist in La Plata."

It may be more than coincidence that most of the stories telling of the friendliness or passiveness of the cougar toward man are of South American origin. In North America this cat has no such reputation with the people at large.

The jaguar is the largest carnivorous mammal of South America, the largest animal which may be said to even occasionally live on human blood. It might be well to speak of the smallest mammal which enters into the category, an animal which preys upon man to far greater extent. This is the vampire bat, *Desmodus rufus* or *rotundus* of the scientist.

The true vampire bat is not a very large bat, only slightly larger than the big brown bat which flies about of a summer's evening in the States. A number of other varieties of bats are sometimes called vampires by those who know no better, but the only truly blood-sucking bats belong to the small family which contains *Desmodus,* and these bats are all so much alike that to describe one is to describe all. The true vampire is highly specialized in order to live on fluid blood alone. Its dentition is greatly reduced. That is to say, it has no well-developed chewing or crushing teeth, and the teeth of the front of the jaw have developed into razor-sharp instruments for puncturing. The digestive system is greatly reduced since the highly concentrated diet-blood does not require a large stomach or long intestines. The vampire bites the victim and sucks its blood, and the list of animals which it will attack is a long one. Mules and horses will be attacked nightly in the regions where the bats live, and man is by no means immune. The bat will bite a sleeping man and do it so cleverly that the man does not awake. Often the bat will select the big toe if the foot is exposed, or may bite on the ear or nose. I have never been bitten personally, because I have generally slept under mosquito-bar in the places where these bats occur, but members of my party have been bitten.

Many stories are related of the vampires, and it is not difficult to imagine the consternation which such stories would create in the minds of the timid. The early Spaniards had a horror of them, if we judge from their writings. A very common story is that the vampire beats its wings softly to fan the sleeper and keep him lulled in slumber while sucking his blood, but the probable truth of the matter lies in the keenness of the cutting teeth, which enter the skin without pain.

It is not easy to make direct observations upon a vampire at work, for he will not come where there is a light, and often, when a would-be observer gives the bat every opportunity to bite, the bat will not, although perhaps attacking others of the party. Waterton, in his "Wanderings in South America," relates how he endeavored to be bitten but was always unmolested while his companion's hammock would be blood-soaked in the morning. Nearly all the stories of this bat agree in selecting the great toe as a favorite point of attack when man is to furnish the vampire's meal.

Vampire bats have a great range and are found from Mexico almost to the end of South America. They are confined to the tropical zone for the most part and do not go very high in the mountains. In some places it is almost impossible to keep horses or mules or to raise chickens because of the persistent attacks of this creature.

Introducing the Flea

THIS is the profile of the flea as photographed by Louis H. Tolhurst for the International News Reel. On what might charitably be called the flea's forehead and his neck is a collar of sharp spikes, pointing backward. Thus equipped he is able to run rapidly through an animal's fur but because of his barbed equipment is hard to remove from his furry abiding place.

Magnified in proportion to this picture, the human skin really looks to the flea like valleys and mountains. When he takes a notion of biting he hunts out a place where the blood vessels are near the surface and sets to work. Now that we have seen a portrait of him, or at least a relative, we can readily understand why the common flea was named *Pulex irritans*. The egg of a flea is about one-third the size of the head of a pin and was likewise photographed by Mr. Tolhurst.

The Ouzel of Multnomah

By CARRA E. HORSFALL

THE MOUNTAIN stream rushed and bubbled and tumbled on its way from the heights to the valley below. All along its sides ferns nodded and swayed in the breezes made by the draw of the air up its course and the downward whiz of the water. One leap of six hundred feet brought the stream into a great seething pool and lashed its body into spray on the way; spray which broke up the sunlight into myriad rainbows and collected them in a radiant arch near the base of the falls. On over pebbles washed round and smooth by the constant wear of waters, to a second drop of many feet.

Just where the stream bent to tumble over this time, its sides were covered with moss, thick, luxuriant and water-soaked; and within one clump well over the edge, there nestled a cozy bird home. No commonplace sort of house was this. The walls were fully four inches thick, made of beautiful growing moss, full of water but not soggy, shaped like a ball; with the softest old leaf and moss lining inside and the doorway near the bottom away from the direct spray.

Thus the surplus water was drained away from the interior and the mother was safe and warm, and stranger still, dry.

Back and forth through the spray flew the owner, caring naught for the wetting because her feathers were well waterproofed, and had she not chosen again the old home site clearly inaccessible to any possible enemy? Thus the Water Ouzel undoubtedly reasoned as she hunted along the floor of the stream far below; hunted for the larvae of the shad fly, dragon fly, and caddis which make their homes in leaf or stone cases cemented together and held in place by the clever architectural ability of their owners who provide the necessary fluids from their own bodies and who will relinquish their holdings only after forceful argument with the evictor.

The Water Ouzel is not a swimmer, not having the traditional swimming feet, but better yet is able to walk on the bottom of the streams against the beat of a current which would unbalance many a strong man. Thus it is possible for him to procure his food; and he may be seen along any mountain stream at any time of year always seeking the water-dwelling creatures. Always? Well, no, for at times he seems to be only playing with the spray, dashing in through the white foam, running along a few feet, popping out on a rock to teeter up and down, or rather to dip in courtesy fashion until one would expect his frail little legs to snap from the exertion; then in again and on to a point further up the stream. Soon he slips out and quietly but swiftly flies down the stream to begin the performance all over again, ever and anon pouring forth a long joyous bubbling strain of bird music whose shrill

piping is heard above the tear and grind of the rushing torrent.

But if the nest up under the falls has occupants, he tends strictly to business and hunts and feeds incessantly, for baby ouzels are very hungry creatures and constantly stretch their necks and poke their yellow mouths out of the door of the nest for food which both Father and Mother Ouzel supply often and regularly during the growing season.

Launching young Water Ouzels is sometimes ticklish business but they seem to withstand the process as well as swallows and bluebirds when they take wing from the nest hole. One nestling when leaving home was forced down and under the stream by the weight and rush of the spray, yet came bobbing serenely up and out onto a log some distance down the stream; none the worse for the experience.

This is but an incident as the new generation joins the old in the eternal war on dragon and caddis and the mountain landscape is gladdened with the advent of more little Dippers along the stream.

The Tragic Story of the Dodo

By Dr. Leon Augustus Hausman

THE OPENING scene in the strange tragedy of the Dodo begins about the year 1598 and is laid in the Indian Ocean near the shores of Africa. There lies a small group of islands, of which Mauritius and Bourbon are the most important. It was on the former of these that there landed a small party of Dutch navigators, under one Capt. Van Neck. They were in search of water and provisions to restock their ship, and they returned with tales of a remarkable bird found in large numbers, a bird more grotesque than anything they had ever seen or heard of before. The sailors went ashore again armed with clubs, killing a considerable number of the birds. They killed, dressed and cooked a number of them, and then sat down in anticipation of a feast! But alas! They found the flesh ill-flavored and tough.

AN OLD PRINT OF THE UNHAPPY DODO

The birds were often seen after this, not only by the Dutch, but by other navigators, and on the island of Bourbon as well as on Mauritius. Between 1610 and 1620 several live specimens were brought as curiosities into Europe.

There were apparently two kinds of dodos, the Mauritius dodo and the Bourbon dodo. The former is shown in our photograph of a drawing made about 1612. This bird was about the size of a large turkey gobbler and was ashen gray with a bluish cast, lighter on the throat and breast. The short, stubby wings were useless for flight, and bore a few light yellow feathers, as did also the tail. The most remarkable feature about the dodo was its enormous beak, an organ which served it well for tearing the vegetation that comprised the food of the bird. Despite its rather ferocious appearance it was an usually mild-mannered and unsuspicious bird, and in habit extremely slow-moving and torpid. The Dutch sailors called it *dodoor,* or the *sluggard,* from which its common name, Dodo, is derived.

The Dodos found on the island of Bourbon were truly gorgeous creatures! They were of a beautiful silvery-white in color, with yellow wings. The bill and feet were likewise brilliant yellow, and altogether they must have been, despite their rather grotesque proportions, handsome natural elements in the scenery of the island!

The voice of the Dodo was humorously out of proportion to so huge a bird, being merely a plaintive, petulant cry, similar to the noise made by a young gosling! The last record of the Dodo shows that it survived until the year 1681. Since that time no one has seen the unfortunate bird. Sailors visiting the islands killed the defenseless and stupid creatures with clubs; but pigs, introduced into the islands by sailors, multiplied and devoured the eggs of the Dodos and the newly hatched birds!

Today our source of information concerning the Dodo consist of the records and drawings of the early navigators, and many fragments of the birds themselves, principally bones, preserved in various museums and universities throughout the world.

Lightning Facts and Fancies

By CHARLES FITZHUGH TALMAN
U. S. Weather Bureau

SCIENTIFIC knowledge of lightning is of recent growth. At the close of the seventeenth century this natural phenomenon was declared by Dr. John Wallis, one of the most learned men of his day, to be an explosion of "nitrous and sulphurous vapors" in the air, similar in nature to the firing of gunpowder. A few years later its resemblance to the sparks produced by a marvelous new device known as the "electrical machine"—an instrument for generating electricity by friction—attracted general attention, and in 1752 Benjamin Franklin proved, by his celebrated kite experiment, that lightning is, indeed, an electrical spark. The next hundred years yielded a great deal of information about the effects of lightning, but very little about its physical characteristics. Much more has been learned under this head in the past twenty years than in all previous time. Last but not least, several important problems connected with the subject have not yet been solved.

Down to the middle of the nineteenth century people did not even know what lightning looks like! For ages artists had been drawing and painting it in zig-zag streaks, with sharp angles. To this day it is always thus shown in conventional designs. In 1856 James Nasmyth, the famous Scottish engineer, expressed doubts about the existence of such lightning. Shortly afterward lightning began to be photographed, and it was thus found never to be angular, but always more or less sinuous, like a meandering river, often with small branches, in the sky.

Photography reveals many other things about lightning. One is the fact that a great many flashes are multiple, consisting of several discharges in rapid succession along the same path. These flashes are studied by means of a camera mounted on a vertical axis and turned from side to side by clockwork. The pictures are taken at night, the shutter being left open until a flash occurs. If the flash consists of but one discharge, as it is practically instantaneous it will register as a single narrow streak, with or without branches. If, however, the flash is multiple, the movement of the camera will cause the successive discharges to register side by side on the plate, as shown in one of our pictures. As the speed with which the camera turns is known, it is possible to determine both the intervals of time between the discharges and the total duration of the flash. Thus we find that multiple flashes sometimes last for half a second or more, though each of the individual discharges may not last more than a few hundred-thousandths of a second. The flickering appearance that we often observe in lightning is due to these multiple flashes.

COURTESY ARMY MEDICAL MUSEUM

LIGHTNING-PRINTS ON THE HUMAN SKIN

Not photographs of neighboring trees or leaves, as popularly supposed, but merely the result of a branching electrical discharge passing through the tissues. They are bright pink and usually disappear in a few days. The prints above shown, from Jellinek's "Atlas der Elektropathologie," were found on the back of a gardener in Vienna after he was struck by lightning.

Photography is also applied to determining the distance of a lightning flash and hence the dimensions of any of its features. For this purpose a stereoscopic method is used, two cameras being mounted side by side and exposed at the same time. Terrestrial objects of known distance from the point of observation are photographed along with the

lightning, and a comparison of the two pictures, plus a little mathematics, gives the distance of the lightning much more exactly than the old process

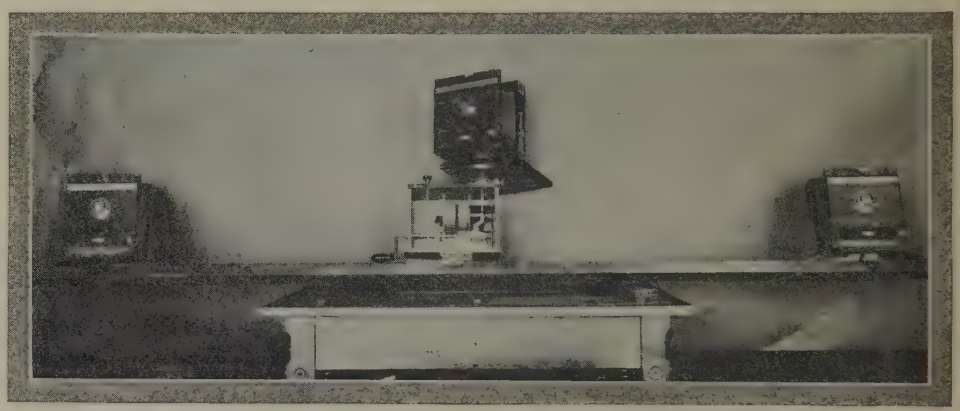
PHOTOGRAPH BY E. S. JOHNSTON

WHERE LIGHTNING STRUCK A POTATO PATCH

The plants were killed over an area 30 feet in diameter, indicated by the stakes.

of counting seconds between the flash and the thunder.

Black flashes of lightning and black borders of bright flashes are, like the purple cow, found only in pictures, though they are not the product of an artist's imagination. They result from a photographic phenomenon known as the "Clayden effect," and appear in photographs of artificial electric sparks as well as of lightning. If a spark of moderate intensity is photographed and the plate is subsequently exposed to a very feeble general illumination, the picture will show an ordinary white flash. If the after-illumination is somewhat brighter the spark will not appear on the print at all. Lastly, if the after-illumination is still brighter, the spark will print black. In order, therefore, to get black flashes the plate must have been exposed at least twice to light. Suppose, now, a lightning flash has registered its impression on the plate and before the shutter is closed a second flash occurs in the same field. If the latter is bright enough, the clouds will be lighted up and the light reflected from them will cause the diffuse illumination of the field necessary to produce "reversal" of the original image. That often only the border of a bright flash is reversed is explained by the fact that this is less bright than the core of the discharge, and is more easily affected by the subsequent illumination of the field. As the Clayden effect often obliterates the image of a flash altogether, it is a disadvantage in lightning photography. Some kinds of plates have been found to be much less susceptible to it than others, and these are chosen for use in the scientific study of lightning.



PHOTOGRAPHIC APPARATUS FOR THE STUDY OF LIGHTNING

As used by Dr. B. Walter, of Hamburg, Germany. In the center is a revolving camera, turned by clockwork. This is flanked by a pair of stationary cameras for taking stereoscopic photographs of lightning.

PHOTOGRAPH GENERAL ELECTRIC CO.

ARTIFICIAL LIGHTNING STRIKING A MINIATURE VILLAGE

A two-million volt discharge, as produced in the High-voltage Engineering Laboratory of the General Electric Company, Pittsfield, Mass.

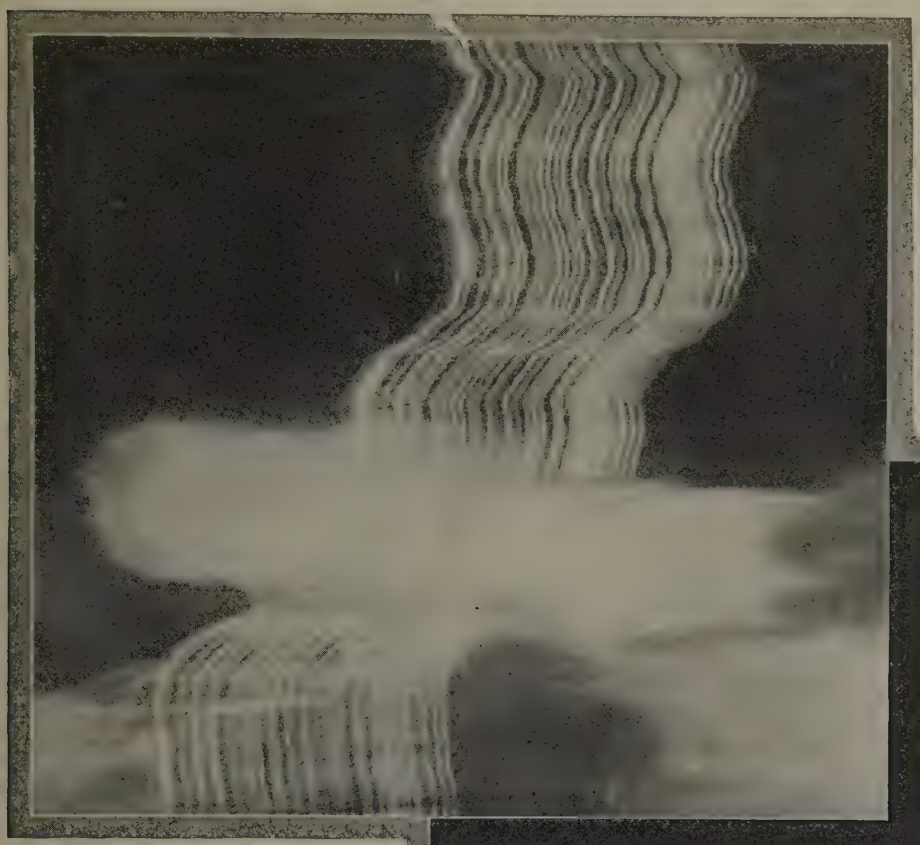
The "heat lightning" that plays along the horizon on summer evenings is merely the reflection of thunderstorms too far distant to be audible. Whether silent glow-like discharges of lightning actually occur in the sky in some cases, or whether, on the contrary, all apparent "sheet lightning" is the reflection of "streak lightning," is an unsettled question.

"Beaded lightning" and "rocket

lightning" are both so rare that whenever either of them is observed it is generally reported at length in the scientific journals. The former resembles a string of glowing beads, while the latter is a form of streak lightning that shoots up into the air at about the apparent speed of a skyrocket.

One of the most spectacular forms of lightning (if it can be so called), occurs in the Andes, and has occasionally been reported from other mountainous regions. At times the mountains seem to act as gigantic lightning rods, giving rise to more or less continuous diffuse discharges between themselves and the clouds. A few years ago American meteorologists thought they had found an example of this striking phenomenon in North Carolina, but the once mysterious "Brown Mountain lights" have been proved to be merely the beams of distant locomotive and automobile headlights or due to other human agencies.

"Ball lightning" has thus far baffled all attempts at explanation. That it actually occurs cannot be doubted. A recent German work on the subject, by Dr. Walther Brand, contains an elaborate discussion of 215 cases reported by careful observers. Such lightning occurs during thunderstorms in the form of a small luminous ball or pear-shaped body, averaging a few inches in diameter, which either moves freely in the air or travels along objects as if attached to them. The ball may be visible only an instant or it may remain for several minutes. Its appearance is often but not always preceded by an ordinary flash of lightning. It is accompanied by a hissing or humming sound. It disappears either silently or with a light crack or with a loud explo-

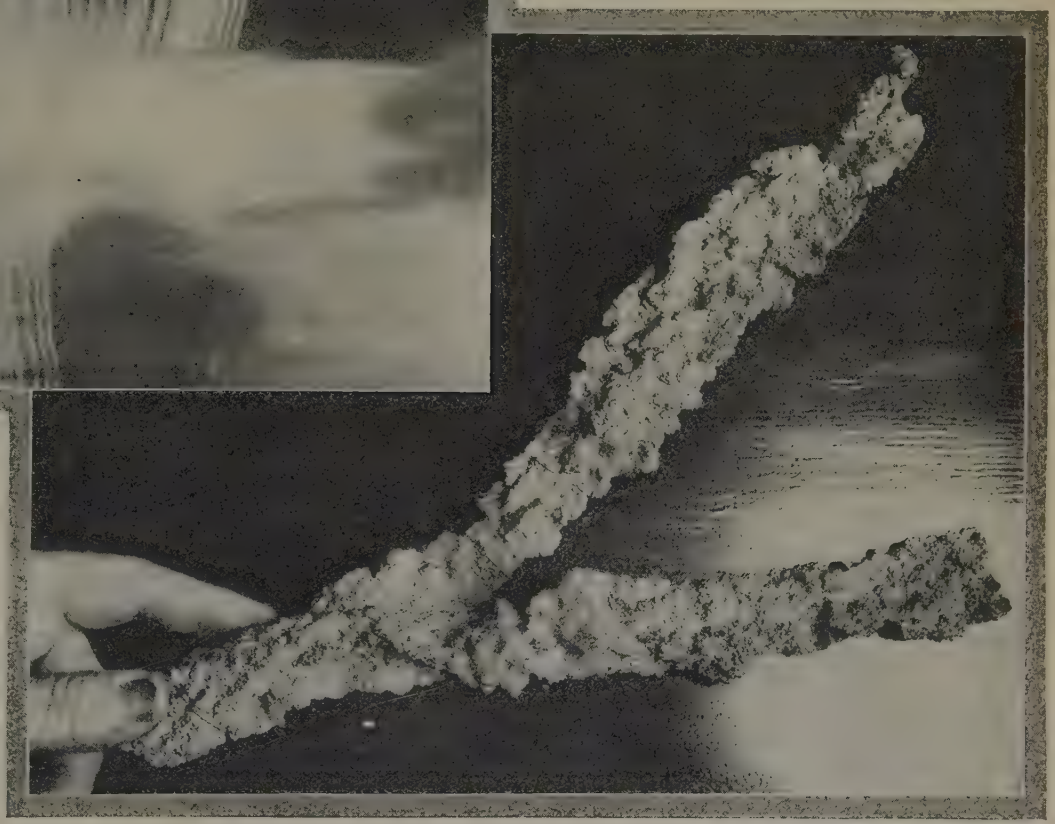


(LEFT)

HOW THE PHOTOGRAPHER ANALYZES A LIGHTNING FLASH

This was a multiple flash, consisting of about 36 discharges occurring in rapid succession along the same path, the whole flash lasting about half a second. The camera turned on a vertical axis during the exposure, thus registering the different discharges separately.

PHOTOGRAPH BY D. J. MCCARTHY



(RIGHT)

"SOLID LIGHTNING"

A fulgurite, or lightning-tube, formed by lightning striking in loose sand. The heat of the lightning fuses the sand along the path of discharge. Another type of fulgurite is formed when lightning passes through solid rock. The path of the lightning is plainly revealed in a section of the rock.

PHOTOGRAPH BY RENE BACHE

sion, and leaves behind it a sharp-smelling smoke or mist. In some cases several balls are seen at once. The unattached balls display a fondness for entering houses, not only by way of doors, windows and chimneys, but also through small cracks. They

PHOTOGRAPH KEYSTONE VIEW CO.

WHAT LIGHTNING DID TO A TREE

The stripping of bark is an explosive effect, due to the sudden generation of steam along the path of discharge.

are said to be harmless to human beings, whom they seem to avoid as they also avoid all other good conductors. The attached balls, on the other hand, travel along good conductors and cause serious burns if they touch the human body.

One of the stereotyped statements of the text-books is that lightning is made visible by the "heating of the air," just as the filament of an incandescent lamp is made to glow when an electric current passes through it. As, however, no physicist has ever succeeded in making air luminous by any ordinary heating process, this explanation will hardly pass muster. The real explanation, according to Dr. W. J. Humphreys, must probably be sought in electrical phenomena within the atoms of the atmospheric gases, rather than in the molecular movements that constitute heat.

Lightning is a formidable enemy of mankind and its investigation is, therefore, one of the practical problems of electrical engineering. Fires due to this cause destroy about twenty million dollars' worth of buildings in the United States every year. Another kind of lightning hazard is rapidly increasing from year to year with the extension of telegraph, telephone, lighting and power lines over the country. When a stroke of lightning occurs anywhere near such lines it causes, by induction, a sudden surge, or rush of current, which is likely not only to injure wires and insulators, but also to

PHOTOGRAPH U. S. WEATHER BUREAU

BLACK LIGHTNING

It is often seen in photographs, though it does not actually exist. It is a trick of the camera.

be carried into buildings, where it may damage costly electrical machinery and possibly cause fires. Buildings are protected by lightning rods, the value of which is fully proved by statistics. Transmission systems are provided with lightning arresters, intended to furnish a bypath by which the excessive current due to a lightning discharge is carried off

PHOTOGRAPH BY DR. B. WALTER

HEAVEN'S ARTILLERY IN ACTION

The angular zigzag lightning of old-fashioned pictures is conspicuously lacking in photographs of lightning.

the western states during the past season. When lightning strikes a tree the ordinary result is to splinter the wood or strip off bark through the sudden generation of steam. In the great majority of cases the tree is not set on fire. Nevertheless the aggregate number of forest fires started by lightning is, in many parts of the country, greater than the number due to all other causes combined. As compared with fires due to human agencies, lightning fires are likely to occur in places difficult of access, and thus get beyond control before they can be reached by the fire-fighting forces.

Lightning is one of the causes of the "static" that worries radio listeners-in, though probably not the principal cause, as was formerly supposed. While lightning flashes cause clicking noises in the receiver, the heavier and more troublesome rumbling sounds known as "grinders" are believed to be due to electrical disturbances in the upper levels.

to the ground near the place of origin, instead of traveling along the wire. The correct design of such protective devices depends upon a thorough knowledge of the characteristics of lightning. This knowledge is gained partly through experiments with so-called "artificial lightning," concerning which so much has been heard during the last few years. Though the highest voltages attained in these experiments do not approach those of real lightning, the effects are enough like those of the genuine article to afford much information about the proper construction of lightning rods and arresters.

Unfortunately it is not practicable to equip forests with lightning rods, and no remedy is now in sight for disastrous forest fires due to lightning, such as have occurred on a vast scale in

PHOTOGRAPH KEYSTONE VIEW CO.

A DAYLIGHT PHOTOGRAPH OF LIGHTNING

Most photographs of lightning are taken at night. No timing of the exposure is required in such cases, as the shutter is merely left open until a flash occurs. The above example was taken in the daytime, near Toronto.

DAINTY LITTLE PATTERER OF THE SANDS

The Children's Plover

By WILLIAM LEON DAWSON

ONCE, the great Audubon, mistaking a male Yellow Warbler in second-year plumage for an undescribed form, named it the Children's Warbler, and the name stood for a few years until the error was discovered. I think if the naming of the dainty little patterer of the sands which forms the subject of this sketch had fallen to me, instead of to Mr. John Cassin, I should have called it the Children's Plover, *Charadrius puerorum,* instead of Snowy Plover, *Charadrius nivosus.* For if there is one thing above another which children love to do, it is to play in the sand; and when to the whisper of rustling sand are added the saucy buffetings and mock terrors of coquettish waves, you have a situation in which all of us become, frankly, children.

But whereas a day at the sea-beach is a treat for most of us, a relaxation after which we put on our stiffest frowns and pretend that we never lost our dignity, this Juan of the beaches is a child the year around. He has no pretensions to make, and he has found an age-old content in just playing in the sand.

NEST AND EGGS OF SNOWY PLOVER

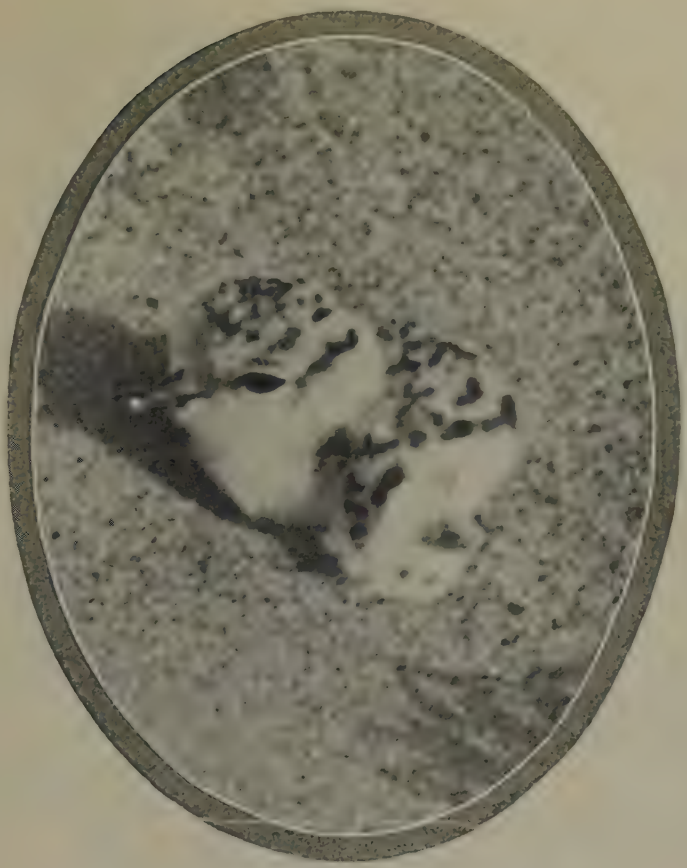
Usually the nests are ornamented with bits of sea shell or driftwood.

Snowy Plovers maintain themselves for the most part upon the upper beaches just out of reach of the tide. They have lived there so long that their backs have taken on the exact hue of the sands; and so, at the distant approach of danger, they do not think of running or hidding, but only of sitting quietly or standing with breast averted. Their snowy under parts are, indeed, something of a give-away, though they match the foam at the wave's edge well enough, and, also, the glistening shells which sometimes strew the upper beaches. But by way of reducing the lustre of the under plumage, the Plovers avail themselves of every little depression in the sand—a hollow scooped by careless fingers or squabbling gulls or, best of all, a footprint. Once, in early morning, I sought the freshness of the sea-beach, thinking to anticipate the earliest of the human "sand lizards." But, while there were no bathers about, an ambitious horseman had been before me, and his galloping steed had plowed a heavy furrow in the upper sand, for the

tide was high. Here I found a company of Snowy Plovers, forty of them, snuggled down in the hoof-prints, one to each "dug-out." with never a vacancy in the entire series. The Snowies were in high spirits over their good fortune, and when I sheered off, out of respect for their manifest wishes, the two or three nearest birds, which had been disturbed, scuttled back to quarters with murmurs of satisfaction.

A novice may travel the length of the beach and never suspect the presence of this midget population, which, meanwhile, has been slipping ahead furtively, or else sitting tight if only there was room enough to let the unsuspecting pilgrim pass. But when a barrier intervenes, an inlet cutting through the sands, or a jutting promontory, the accumulated Snowies race down the beach and take off with plaintive, sweet cries; while the traveler, never having dreamed of the trouble he was making rubs his eyes in astonishment.

While the appearance of these birds is always so childlike and bland, they cherish all the traditions of grown-ups, and they go about the business of housekeeping with becoming seriousness. And although the details of courtship have been conducted, of necessity, in the open, the chances are that our first suspicion of what is afoot is awakened by the apparent reluctance of two certain birds to absent themselves completely from a certain stretch of sand. Oh, to be sure, either one of the birds is perfectly willing to pilot you *away* from that particular spot, if you are indulgent enough to follow. The bird even faces you amiably, if need be, for attention, and then turns and patters away a few steps. Fortunately, a dog will yield to this lure, and a silly, yapping cur may have the satisfaction of chasing an all but attainable bird for a hundred yards, if he will. But if he does, his temptress will quit him finally with a merry *too leep,* while he, poor befuddled beast, struggles with the suspicion that he has been misled.



WARILY WATCHING THE INTRUDER

The plover seeks the haven of any footprint in the sands.

BACKS THE HUE OF THE SANDS

On the approach of danger the bird will hide its snowy breast.

We, more wisely and more tenderly, may stay behind to note a tell-tale frequency of delicate footprints, footprints which lead at last by very multiplicity, to a slight elevation, a sand-dunelet, upon the top of which repose three sturdy eggs. These eggs, again, are sand-colored, but are marked sharply with black vermiculations and broken hieroglyphs, like shadows cast under a burning sun by coarse sand. Sometimes the plover nest has no lining whatever; but usually the careful birds have brought bits of shell or else fragments of driftwood to ornament their home. Usually, also, there is some object—a clam shell, or a piece of drift, or a bright pebble—not too far away, which may serve the bird as a beacon in case of wind. In one of our illustrations the marker is provided by an encircling piece of dried kelp, all too suggestively like a serpent; and we cannot help wondering whether the owner of this beach bungalow hit upon

such a design as likely to afford a double protection from wind and from prowlers.

Wind is a tireless foe of these courageous little sand folk, but the birds, apparently, have learned how to cope with all but the severest of the wind attacks. I have seen eggs so buried in the wind-swept sand that only a tiny portion of one egg was visible; yet the next time I happened along that way, the eggs had been rescued and a handsome tiled flooring of shell fragments provided. Curious to know how the birds were able to effect such a rescue, I once helped the wind's trick, and left a nest all but buried in hand-helped sand. The mother bird, glad enough of an excuse to stretch her legs and snatch a bite to eat at the border of a neighboring lagoon, had not suspected my part in the mischief. When she returned (the observer meanwhile having retired to a discreet distance and produced binoculars), she attacked the problem of recovery promptly. Stooping over the buried eggs, she thrust her beak deeply under one of them, bending it upward and inward, so as to secure a good purchase, and then hauled away right sturdily. After tugging for a time with, apparently, satisfactory results, she reversed her position, settled to her eggs and began kicking vigorously backward, tedder-fashion, sending up as she did so tiny showers of sand. Each egg she treated thus in turn, and by the time she had given the entire nestful two rounds of this alternate prying and kicking, she had the eggs fully cleared of the sand. Then she settled herself to incubation, head to the wind.

"I CAN TRUST YOU, SIR."
Often the plover will sit tight waiting for the intruder to pass.

This little drama had been enacted with such celerity and neatness that one could not doubt its customary use.

A more terrible enemy for this plover lurks in the bosom of that deceptive sea. Not always does she brood upon destruction, but once or twice, perhaps, in a season she yields to the moon-madness; or else, urged by the taunts of an unseasonable gale, she sweeps her arms over the uttermost beaches and carries off whatever booty offers to the chambers of chaos. The adult plovers escape, chastened children now; but their eggs or the helpless young are but the memory of a night.

It were idle to reason with the sea. She carries whom she will upon her bosom, full tenderly; and whom she will she devours, full ruthlessly; and none, save her Lord, may call her to account.

It is such "accidents" as these which make us hesitate whether to be tender. Let dogs bay and winds howl and tides sweep, we will be tender.

But now, I wonder why! Is there not a promise here—a promise as well as a mystery? We call ourselves children of Nature; but are we not really something more? Why do we carry a quarrel in our hearts with Nature's ruder children, the sea, for example, unless it be that our parentage lies higher? And if we are "children" and "heirs," then it's *our* world—and—and—*our* sea. Maybe we are, somehow, at fault for the naughtiness of the sea; and maybe if we always knew the Father's will—and did it—the sea, the tender, tractable sea, would always smile for us—and for *you*, little plover children.

THE PLOVER GOES ABOUT ITS HOUSEKEEPING WITH BECOMING SERIOUSNESS

THE MUSKRAT LIVES CLOSE TO THE WATER

He wears a beautiful coat of rich brown fur that keeps him warm while swimming or sleeping.

The Furry Muskrat

By VERNON BAILEY

U. S. Biological Survey

SPLASH! and the water flew all over me as I grabbed at a slippery tail beside the canoe and got only a handful of wild rice stems that a muskrat had been carrying to his house one bright moonlight night. John, my Indian, had paddled so silently that the rapidly approaching swimmer had failed to notice that we were not just an old log on the surface of the river. He evidently had intended to dive under the log and he did, but was surprised to find anybody inside of it. I had thought to add him to my collection of camp pets as I had another tame muskrat that was lonesome for company of his own kind.

Jerry, as we called our tame muskrat, lived in a box in the edge of the lake where he was very comfortable but not entirely contented. One night he gnawed a hole in his box and went out into the lake to try and find his own people, but he did not find them and missing his soft nest and good eats of cat-tail roots and rolled oats, he came back the next night and quietly slipped in through the hole and went to bed in his old nest. That was home anyway and home, humble though it may be, means a great deal to a muskrat.

Because muskrats are great builders and live in the water, they have been called "little cousins of the beaver" but, while well acquainted and on friendly terms with the beavers, they belong to the meadow mouse family, differing from their smaller brothers in larger size and in having sword-shaped instead of match-shaped tails.

Their houses are somewhat similar to those of the beaver but simpler and less substantially built of finer and softer materials. They are mainly for winter use and are often allowed to go down and cave in during the summer and then are built up again in the fall. A good-sized, freshly built muskrat house often stands five feet high and about as broad at the base, or at the water level. Sometimes they rise out of the water four or five feet deep but more often rest on the bank of a stream or a bit of floating marsh. They are generally built of grass, reeds, sedges, cat-tail stems, sods, roots, and mud, interlaced and plastered together with firm walls

and a conical form well planned for strength and comfort. When the walls are frozen solid in winter they are not only a protection from the cold but from most of the natural enemies that roam about in winter. There are no visible windows or doors in these houses as the only openings are usually one or two water holes, leading downward from the edges of the nest chamber and out through long tunnels under the water of the lake or stream. There is always a little ventilation through the top of the house, as shown by frost on cold mornings from the breath of the occupants.

The one room inside of the house is large enough to accommodate one or two or a whole family of six or eight muskrats when cuddled closely on the soft moist floor of grass and roots brought in for bed or food. The bed is always clean and generally slightly musky. The air is kept comfortably warm by the bodies of the occupants, even when there is heavy ice over the water and piercing cold outside.

The winter is a season of comfort and safety, except for traps. Long journeys are made under the ice in search of food and in visiting back and forth among the houses and bank burrows. Visiting, fighting, courting and mating are a part of the winter life besides the everyday work of getting food. Still, when spring comes and the sun has melted holes in the ice, the muskrats always welcome the warm days by coming out of the cold water and sitting on the edges of the ice to eat their meals.

They do not store up food for winter but seem always to find an abundance under the ice, digging for toothsome bulbs and tubers and roots and eating the green stems of tules and other water plants, or varying their diet with fresh water mussels and occasionally a small turtle. There is no evidence of their catching fish but a dead fish might be eaten if they craved animal food for a change. In spring and summer they work back into the marshes for tender stems of grasses, sedges, cat-tails, and many succulent plants but also depend in part on the roots of cat-tails, waterlilies, and the growing stems of wild rice from the deeper water.

In May or June the young are born in warm nests, either in the houses or in bank burrows, usually five or six in a litter but sometimes more. There is one record of 13 young in a family but this is an unusual number. No one knows what the average number of young is nor how many litters of young are raised in a season by one old mother muskrat. Judging by the small young seen swimming about at all times in summer, even up to early fall, it would seem that several families of young must be raised in a season.

The young at first are the size of small mice, pink and hairless, with eyes and ears securely closed and with only one well-developed instinct, to cuddle up to their furry mother's breast and feast on the warm, rich milk with which she supplies them. For several weeks and probably a month they do not leave the house where they were born but when about as

JERRY

At six weeks he was a regular little muskrat.

A MUSKRAT HOME

Built of finer and softer material than the beaver house.

AT LUNCH ON A TOOTHSOME ROOT

The muskrat likes water plants and an occasional mussel or small turtle.

big as chipmunks, well furred and with bright eyes they venture out of the water-door and begin to gather a part of their food from the tender water plants. Then they are easily tamed and make interesting pets if one has time to feed and care for them. Like most wild animals they must be pleasantly and closely associated with man to lose the deep-seated fear of untold generations of harassed ancestors.

Little Jerry, the one we kept all summer until he was a well-grown muskrat, was not afraid of me but he did not like to be handled and when caught in my hands would wiggle and squirm to get away. He lived in the house with Paddy and Johnny, our two baby beavers, and slept and ate with them but was much quicker and more independent than they. He always picked out the food he liked best even from under their very noses. Rolled oats were his favorite food but he also ate many water plants, roots and bulbs, besides grass and clover. He would not touch meat nor fish nor crawfish when offered to him. He lived a comfortable and contented life with us until one night the desire to see the big world overcame his love of home and he climbed over the top of his pen and went down to the lake where the other muskrats lived and where he could have friends of his own kind. We were sorry to have him leave us but he had taught us many of his muskrat ways and learned some of ours that may have been useful to him later in life. At any rate he would have some good, true stories to tell to his muskrat friends around the water hole in the warm muskrat house next winter. He went with our best wishes for a long and happy life.

The Yellow Swallow-tailed Butterfly

By Edward A. Preble

THE BUTTERFLY has come to be considered as typifying a young woman who has nothing to do but amuse herself, and no responsibility, and when one sees the light-winged creature flitting from flower to flower, pausing only at the most beautiful and the sweetest, the simile seems very apt. And of our familiar butterflies what species is more pleasing than this one of yellow and black, as it rests for a moment on a panicle of white phlox, sipping the nectar which is borne so deep in the corolla tube that only such long-tongued visitors are able to reach it. In its probing for the sweet fluid the insect helps to fertilize the phlox, although this plant, unlike many others, is not entirely dependent on such assistance.

PHOTO CORNELIA CLARKE

DAINTILY FROM BUD TO BUD

The yellow swallow-tailed butterfly flits today thinking not of tomorrow

But like all creatures which have no thought for the morrow, the butterfly must pay for its lack of responsibility. After a few days or weeks of pleasure-seeking, most butterflies die, having laid the eggs which, during the same season or the next, will perpetuate the race. Some species, indeed, on the approach of autumn, are able to conceal themselves beneath a loose flake of bark and thus survive the winter, to emerge with the first warm days of spring, and lend their beauty to that bright season. Our beautiful *Papilio turnus*, however, has not this power, but perishes even before winter approaches.

The caterpillars of the yellow swallowtail feed on the leaves of various trees, including the cherry, but are not numerous enough to be injurious. They have the curious habit of spinning a web couch which is suspended from the edges of a curled-up leaf. On this they rest when not feeding, as if in preparation for that merry, carefree life they are to lead when they become mature and take wing to fly away.

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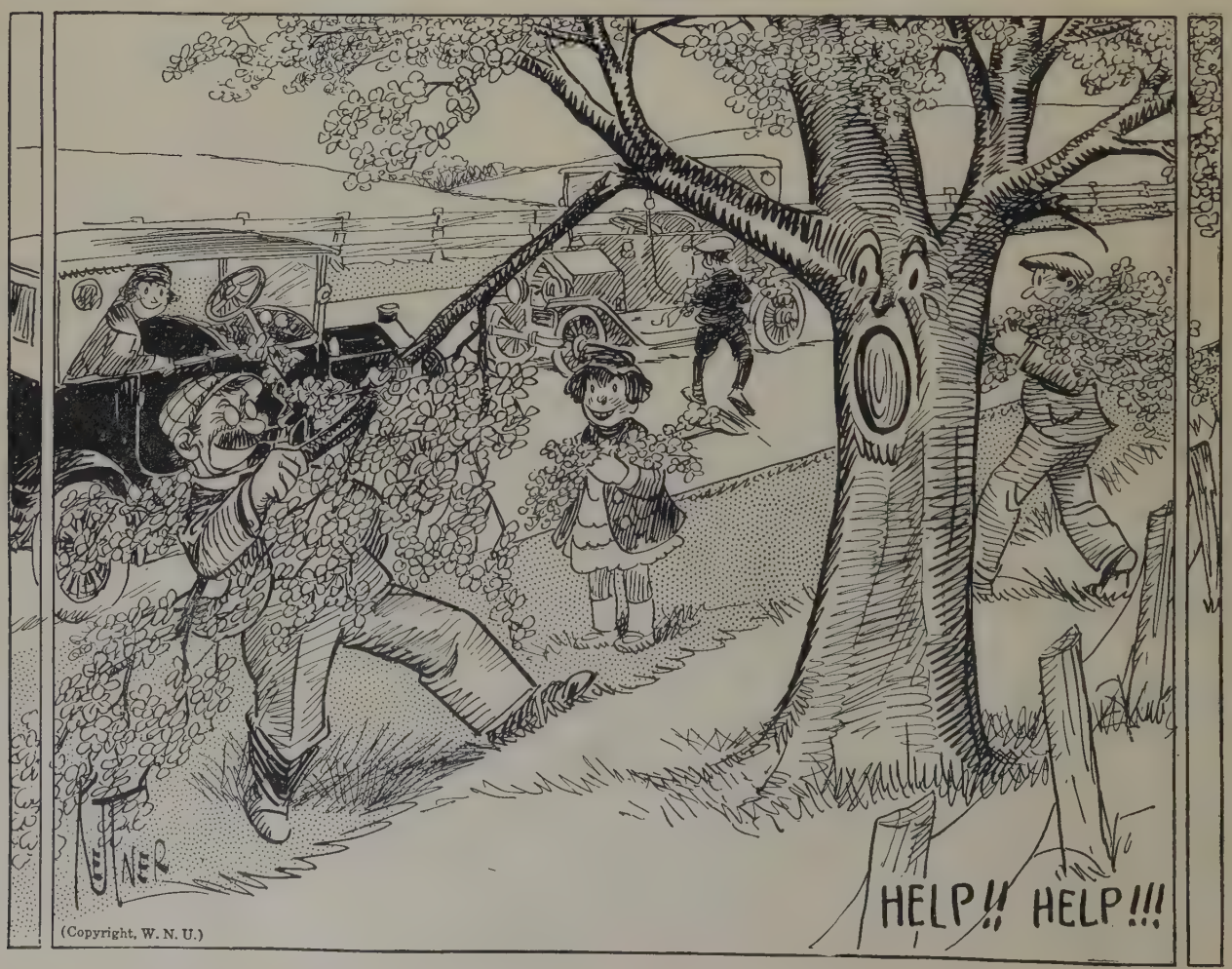
The Nature Lovers

This is the title Harrison Cody gives to his drawing to the left. It tells a story of Outdoor Manners that needs no words, or in the telling of which words fail.

Below, Kettner for the Western Newspaper Union shows us the trials and tribulations of trees and shrubs that try to survive "Along the Concrete."

Don't wear out the hospitality of the out-of-doors. There are "Outdoor Good Manners" as well as "Indoor Good Manners."



(Copyright, W. N. U.)

HANNY IN THE PHILADELPHIA INQUIRER

SMITH FOR THE N.E.A.

The American Nature Association urges its members to join in the work of spreading the thought of good manners out-of-doors and to aid in stopping thoughtless trespass upon private property and destruction of public property.

Above, to the left, Mr. Hanny entitles his cartoon, "Improving the Beauties of Nature." Mr. Smith, above (right) draws, "Another Hibernating Animal That Goes Coo Coo in Spring." Below Mr. Johnson pictures the troubles of the farmer "In Maytime." Let's make unanimous the Outdoors Good Manners campaign which is being fostered by the General Federation of Women's Clubs through its Forestry and Wild Life Refuges Committee.

HERBERT JOHNSON IN THE SATURDAY EVENING POST

Wood and Water

By ARTHUR NEWTON PACK

PICK up a government bulletin and you will read that the National Forests of the United States comprise some 156,000,000 acres. That figure sounds tremendous, does it not? But I wonder what sort of a picture comes to your mind. Is it a picture of green trees—fir and hardwoods, gigantic sequoias, and white birches amid a setting of pine and spruce? Yes, when you stop to think, there will be pictures of many kinds—pictures of endless miles of gaunt charred stumps, pictures of empty plains and rim rocks in the West, with only here and there a bit of sparse vegetation, even a semi-desert scene where gaunt tree cacti and their smaller prickly brethren dot a landscape of low thorny shrubs, mesquite and greasewood. All that is a part of our National Forests.

When you have traveled for days through southern Arizona, often in National Forest territory, seeing almost nothing in the form of what you once knew to be a real tree, you may think there is something wrong. The scraggly cottonwoods and sycamores growing along the dried-up river bottoms are trees to be sure, but not the kind we build our houses with at home. Do not rush to the conclusion that our National Forest Service conceals another vast scandal worse than Teapot Dome. It is not a scandal at all, but a vast practical project of conservation. This is an upside-down country where rivers only occasionally appear upon the surface, and then in raging floods. At other times they sink far below the sandy soil and are lost. In the long dry seasons one would think that only the road-building officials even pretended to guess where the rivers belong, for they build bridges over mere sandy depressions, or dip the road like a roller-coaster through what should be a ford. The cry is "Water, water, give us water;" and in this the Forest Service is trying to help. You say it is not forestry? It is forestry in the highest sense of the word, protection of the native vegetation to conserve and control that erratic moisture supply. Even the mesquite and cactus help to retain water. Farther up the mountain sides are deep canyons where live oaks grow, twisted and gnarled into picturesque forms. Although far from suggestive of commercial value, they play a vital part in maintaining the life of southern Arizona, for it is with live roots below the ground, rather than with tall, straight trunks, that water is conserved, that floods are lightened, that erosion is prevented.

The timber line on the mountains, too, is upside down, for generally the real tree vegetation begins halfway up and extends to the very summits, where, at last, fine large pines transform the landscape into a real forest world. Probably the whole area of our National Forests in southern Arizona includes only 10 or 15 per cent of this true forest land, but that meager percentage means everything to the surrounding country, merely in holding back the melting of winter snows. Such forests must not be lumbered off; they may be cut only by the removal of larger trees here and there, selected and marked by a forester who knows that they will otherwise die, who realizes that the root system of one old forest giant is not nearly so valuable for water conservation as the smaller fibrous roots of the many young trees which will spring up in its stead.

PHOTOGRAPH U. S. FOREST SERVICE

THE MOUNTAIN TIMBER LINE IS UPSIDE DOWN

Tree growth begins half way up and extends to the summit of the mountains.

Even thus handled, the pine forests of the Arizona mountain tops represent valuable timber in a region where wood is not elsewhere found. They furnish a local supply of lumber, not indeed adequate to local needs but serving to build cottages and homes far from city lumber yards. One sees

PROVISO TOW

in southern Arizona forest utilization at its best. One sees the very bark and slabs, elsewhere wasted, greedily taken and broken up for firewood, and even the crooked oak and contorted mesquite put to use for fence posts and fuel.

There have been those who criticize the administration of our National Forests, saying that cows come first and trees second in the Forest Service mind. Cattle grazing on forest land may still be a mooted question, but where land has been turned over to the Forest Service chiefly for watershed protection and does not possess any primary suitability for commercial timber growing, it is only right that it should be utilized for such practical economic purpose as does not interfere with water conservation. Cattle raising in southern Arizona is dependent upon water control, and studies are being made jointly by the Forest Service and the Bureau of Animal Industry, both divisions of the Department of Agriculture, to determine what principles should be adopted for successful cattle raising. Sometimes the principles arrived at are only restrictive, sometimes they deal with the encouragement of certain types of vegetation helpful in conserving moisture and, at the same time, useful as cattle food.

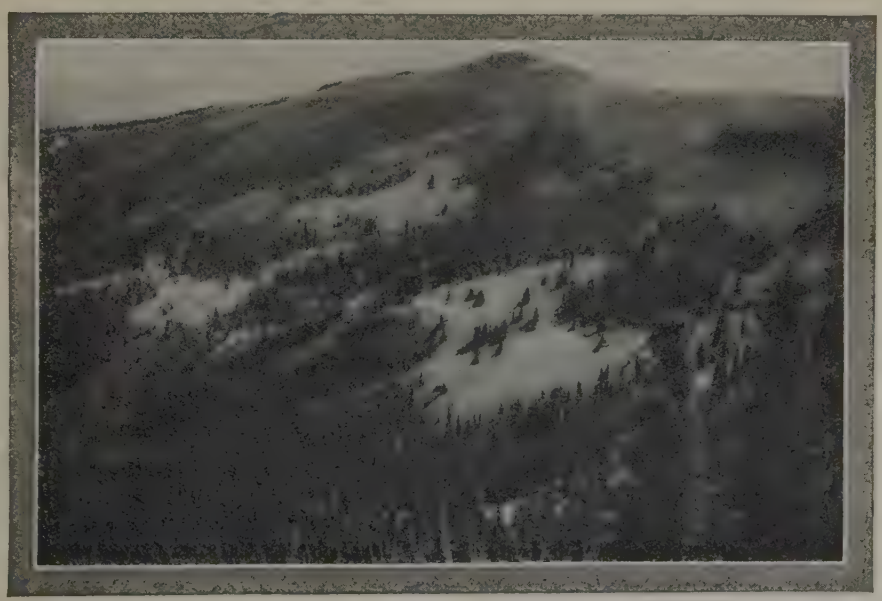
One would find it hard to attribute any virtue to the terrible cholla cactus, the most spiny and dreadful of all American plants. Starving cattle in desperation try to pierce the thorny barricade for a mouthful of the tempting green pulp within, only to die slowly from the festering barbs. In extreme dry seasons the ranchmen often set a torch to these. Only the thorns burn and the nourishing joints remain as safe fodder. This is a kind of fire to which the ever-watchful government fire wardens offer no objection, as it seldom spreads beyond a single plant and does good rather than harm.

Southern Arizona is growing in importance as a national playground. As civilization and commercial development sweep across the country, every healthful region, where the wild remains, becomes a mecca for tourists of an outdoor-loving nation. They travel through our National Forests on roads, partially at least, constructed at considerable expense for their benefit. It is well. Perhaps many travelers are unobservant, but others see and learn enough concerning our great natural resources to return home better citizens, ready to support practical measures for conservation.

PHOTOGRAPH U. S. FOREST SERVICE

BLACK MESA, OPEN COUNTRY WITH OAK BRUSH

On many acres of the National Forests of Arizona there is sparse vegetation.



PHOTOGRAPH U. S. FOREST SERVICE

SPRUCE ON THE SLOPE OF MOUNT THOMAS

A part of the National Forest timber in Apache County, Arizona.

Our national parks, dotted over the face of the West, are set aside primarily for recreational purposes. Natural wonders possess an educational value, the greater because education is mixed with play. But our national parks are not for economic utilization. In them the timber may never be sold, in them we pray that natural lakes and streams may ever be kept in their original beauty. We need

to set aside from the wilderness of America more such oases of beauty, natural and historical interest and sentiment, yet there is a limit to how far we may safely go. In forestry, especially in the kind of forestry which includes the practical conservation of both wood and water, there is room for educational recreation and practical utilization, too. Yes, there is more than room; there is need. So long as there is wisdom and common sense in National Forest administration, such wisdom and practical vision as we have today, we need not fear for the wild. When, however, we do see under the name of National Forest a great barren plain or semidesert, valuable as it is for certain conservation purposes, we should think of the 81,000,000 acres of idle land in our country today which is not desert, but really capable of producing valuable forests, and join the army of men and women who demand that at least a portion of it be put to work growing timber for our needs.

Motion Picture Lectures of Bird and Animal Life

WILLIAM L. FINLEY, well-known naturalist, photographer and lecturer, will make a tour of the East during this fall and winter. Mr. and Mrs. Finley are members of the field staff of the American Nature Association, having taken part in two of its expeditions, one to British Columbia, and another to Arizona and California. Their illustrated bird and animal stories appear monthly in NATURE MAGAZINE. They have spent many years in the field with notebooks and cameras gathering a storehouse of interesting information and building up a collection of over ten thousand still-life photographs and over two hundred thousand feet of motion picture negatives of wild birds, animals and other outdoor subjects, one of the most unique and complete natural history records ever made.

THE FINLEYS IN THE FIELD

This photograph was snapped on the recent American Nature Association Expedition in Arizona and California.

The country as a whole, and especially the Pacific coast, owes the Finleys a large debt for their long and persistent efforts to preserve wild life. For twenty years they have been closely identified with the National Association of Audubon Societies in an active campaign of conservation, and mainly through their efforts several of the largest Federal wild-bird reservations in the West were established and maintained.

Mr. Finley is the author of "American Birds," and joint author with Mrs. Finley of "Little Bird Blue." His numerous articles on conservation and his stories of wild-bird and animal life have appeared in *Atlantic, Century, Outlook, Colliers, Country Life, American, St. Nicholas, National Geographic, Sunset,* NATURE MAGAZINE and others.

As a photographer of wild life, Mr. Finley is unexcelled. As a naturalist and lecturer he has an interesting way of telling his wild-bird and animal stories, and his light touch of humor makes an entertainment that is instructive to both children and grown-ups.

He has appeared repeatedly in lecture courses given by the American Museum of Natural History, Columbia University, Universities of Illinois, Minnesota and California, National Geographic Society, Boston City Club, Campfire Clubs of New York and Chicago, as well as Audubon Societies, University Clubs, sportsmen's associations, woman's clubs, Boy Scout organizations and others. His coming eastward for lecture work this winter will be hailed by lovers of birds and wild life. Through his writing his eastern friends have kept in touch but now Mr. Finley is coming in person. Inquiries in regard to terms and dates should be sent to William L. Finley, Jennings Lodge, Oregon.

Insects That Go Armed

By A. B. CHAMPLAIN
Pennsylvania Department of Agriculture

MORE fallacies than facts are current concerning insects credited with having poisonous qualities. Many persons firmly believe that everything which crawls or flies can bite or sting. They attribute to these creatures powers of inflicting wounds that cause death or at least the loss of a limb or some other exaggerated power of destruction.

The truth is that only a very small proportion of our insects are capable of inflicting severe wounds, not necessarily deadly or fatal, but painful and irritating. The stinging or poisoning injuries to human beings caused by insects are mainly either accidental or as a measure of defense and never of offense. Occasionally, on account of infection or of some constitutional trouble or temperamental condition of the person involved, these injuries may assume serious proportions. The injury to average human beings, however, is too small to justify our prevailing fear of all these creatures, and we should learn to know and understand the ones that have these interesting and unique weapons for their protection and defense.

Poisonous gases and acids used as weapons of destruction during the late war were considered as innovations of that particular conflict, and many persons shuddered with apprehension and terror at the possibilities of their future development.

Strange to relate, but nevertheless true, is the fact that poisonous acids and gases have long been in vogue among the insect tribes. Striking examples of these novel means of offense and defense are demonstrated in a spectacular manner by the "bombardier beetles," with their gas bombs. When pursued by some enemy or disturbed in any manner, they discharge an ill-smelling, reddish acid fluid from special organs at the hind end of the body, accompanied by a sound similar to that of a small popgun. As the fluid comes in contact with the air it changes into a bluish smoke or vapor.

A SQUAD OF "BOMBARDIER BEETLES"
Pursued, they discharge a gas bomb that bursts into bluish vapor.

ONE OF THE LARGER HORNETS
Note the stinging apparatus at the end of the egg-laying equipment.

Bombardier beetles are abundant along waterways and river shores, where they live among the debris in these damp situations. During early spring they may be observed, often in colonies beneath stones or logs along the stream. When we lift a log, these active, slender-legged beetles may be seen scurrying away in every direction, and the pop-pop-pop-puff of their acid artillery and the gas barrage that hovers for a moment over them, covering their retreat, reminds us of a skirmish line. The reddish heads and bodies and blue wing-covers seem like military uniforms.

Many species of beetles have at the end of the abdomen little internal sacs in which a supply of this pungent, volatile, bad-smelling liquid is kept, which is used as a means of defense. If we get some of this fluid on our fingers it colors the skin a persistent red and has a sour taste, showing that it is of an acid nature. The predatory ground beetles, to which family the bombardier beetles belong, all possess, more or less, the accomplishment of squirting this fluid out at the enemy when attacked, and are often referred to as the skunks of the insect world.

During a trip into the

mountains of Pennsylvania some years ago, the author and a companion collected a specimen of one of the larger ground beetles, about one and one-half inches long. Upon being grasped, the insect, which had scurried beneath a ledge of boulders, discharged a generous supply of the pungent liquid. The collector, who, upon hands and knees, was peering into the opening in the ledge reaching for the specimen, received the full volume of the substance in the face—eyes, nose, mouth. The fumes were choking and the taste was sour, sharp and disagreeable. It was an hour or more before the eyes could be opened with comfort, and for some time they were bloodshot and irritated.

Standing out with respect to their possession of poisonous organs are the bees, wasps, hornets, yellow jackets and a number of similar creatures, all of which belong to the same order, the *Hymenoptera*. They have four membraneous wings and are easily recognized by most of us at sight, and are more intimately known to many of us from having been interviewed by some of them at one time or another during our careers.

The stinging organs of this group are confined altogether to the females and workers, and are modifications of the ovipositor or egg-laying apparatus. Perhaps some entomologically inclined friend will tell you that he is able to handle wasps, hornets, bees, etc., with perfect immunity from their sting. He may inform you that there are proper methods of doing this trick, and may even demonstrate it to your amazement. Do not let him persuade you to try it, for the specimen that he has grasped and handled so carelessly is a male or drone—and they have no sting.

The sharp-pointed sheath of the egg-laying apparatus or stinger is generally used in inflicting the wound, and the poisonous secretion, mainly formic acid, is forced from glands in the body through the channel in the stinger into the wound. To illustrate the fact that the sting of one of these insects may be quite an involuntary reaction, we quote the following from W. R. Walton: "We still retain a vivid recollection of an occasion upon which there had been a wholesale sacking of bumblebees' nests and the slain bees strewed the ground in considerable numbers. Upon picking up one of the dead bees for a good look, we were very much pained and grieved because the headless corpse stung us on the finger quite badly. She was dead, but it had not occurred to her as yet." Poison of this sort can be counteracted by ammonia water, and the swelling may be reduced by the application of moist clay, which also tends to soothe the pain.

THE SADDLE-BACK CATERPILLAR
This one of the species equipped with poisonous spines.

Ants also belong to this order of insects, and some females and workers possess a stinging organ very much like those we have had under discussion. Another type possesses the ability to eject the formic acid as a fine spray or mist for a distance of a foot or more. They are capable of injecting this poison into wounds that they inflict with their jaws.

Who has not during one time or another turned over a stone beneath which a colony of ants had made a home, and observed them running about in alarm and frantically gathering their possessions and carrying them to safety? If it happens to be a species that has the acid-spraying accomplishment, the fumes may take the investigator's breath for a moment, if he gets too close.

Butterflies and moths appeal to us as the most attractive and beautiful creatures of the insect world. We never associate them in any way with having poisonous qualities. We forget the fact that the young of butterflies and moths are lowly caterpillars that creep and crawl their way through a short life, eating the foliage, stems and fruits of plants, often to our annoyance when the plants grow in our gardens.

Caterpillars or "worms," as they are often designated, may have a repulsive or formidable appearance to many of us, but the majority of them are harmless and may be handled with impunity.

There are a few, however, that will bear watching.

The Io Moth is a very beautiful and striking creature. The males are deep yellow in color with wavy, indefinite purplish markings and lines upon the wings; the head is adorned with beautifully feathered antennae. The females are somewhat larger than the males with wings of purplish-red or brown and with darker markings that add to the general dusky effect.

Green worms or caterpillars are the young stage of this attractive insect. They attain a length of two inches or more and have a conspicuous stripe of dark red bordered with white along each side of the abdomen. Their bodies are covered with clusters of branching spines which arise from

A MEMBER OF THE ASSASSIN BUG FAMILY

Wheel bug whose sharp-biting machinery is plain to see.

numerous tubercles scattered over the surface of the creature. These spines at the tip are very sharp and poisonous and may penetrate and break off very easily when in contact with any soft object.

During the summer, while walking briskly along a mountain trail, the author brushed against the caterpillar of an Io Moth with force enough to dislodge the insect from the leaf upon which it was feeding. The pain caused by the urticating properties of the spines was quite severe, and for a time there was considerable irritation accompanied by inflammation and raised white blotches on the skin.

Io caterpillars often live and feed upon the leaves of corn and grasses and are well known to many of our country folks. There are several other caterpillars which are more poisonous than the one described, although the latter is more commonly met.

The Buck Moth or Maia Moth is a handsome creature too, dark in color, with creamy bands

FEMALE IO MOTH

A beautiful and striking creature with a general dusky effect.

across the wings. The branched spines of the caterpillar react very much like those of the Io Moth, but much more severely, the effects lasting for several days.

Among the slug-caterpillars the most striking is

LARVA OF THE IO MOTH

Its sets of sharp spines are poisonous, breaking off in a soft object.

the "Saddle-back." The moth itself is a small modest velvety-brown affair that would hardly attract attention, but an infant of the species, the caterpillar, never fails to excite the wonder and

curiosity of those not versed in insect lore. This saddle-back caterpillar is about an inch long. On its back is a large green patch resembling a saddle cloth, while in the center the saddle is well represented by an oval brownish spot. At each end and along the body are warts and protuberances upon which grow many thorn-like hairs which sting like nettles when they brush against the skin, causing red areas, then swelling and sometimes numbness or partial paralysis.

As a remedy or antidote for the poisonous properties of these stinging hairs and spines, which are generally of an acid nature, the prompt application of ammonia or moistened bicarbonate of soda is recommended.

True bugs of many kinds are capable of inflicting poisonous bites. Most persons habitually designate all insects as bugs, but the true bugs really comprise but a small portion of the insect world and belong to the order *Hemiptera*. The members of this group have their mouth parts formed into a beak fitted for piercing and sucking.

Assassin bugs, the "cone nose," bed-bugs and a number of others with equally vicious habits are found among the true bugs. In general they are beneficial to man because they attack and destroy many noxious species. Occasionally we find one that has developed a taste for human blood like the "cone nose" or the bed-bug, while there are a number of other species that have been known to attack man when carelessly handled. The "kissing bug" scare that is periodically revived may be attributed to the "Assassin bug" family, several species being involved—all equally dangerous.

When one of these bugs pierces the flesh of a human being with its beak, a poisonous substance is injected into the wound, causing nausea, a burning pain and soreness that may last for several days.

Finally, it may be said that there are certain ordinary insects that are not generally feared, often tolerated and sometimes accepted as necessary evils, that cause more bodily injury and suffering to human beings than any of the most terrifying and ferocious of the poisonous varieties. These are the insects that bring illness and death into our homes—the common house flies that carry the germs of typhoid fever and other diseases from one place to another; the mosquitoes that harbor the germs of yellow fever, malaria and perhaps other dangerous organisms; the body lice, the head lice, the fleas and bed-bugs, and all that come in the category of domesticated insects, the most dangerous and least feared by the majority of human beings.

Catbird Reasoning

By Frederick S. Rickard

IT WAS in July that I made the acquaintance of a pair of catbirds, nesting higher than catbirds usually nest, in an old box elder tree which shades my doorway. At first they scolded incessantly but after a few days they allowed me to sit beneath their home tree, without any signs of annoyance.

One evening I discovered something amiss. Oh—how they did scold as they flew at my head, back and forth, until I was really uncomfortable. I looked about for the neighbor's cat. It was not near. The birds seemed to be trying to decoy me away from a certain portion of the yard and it was there that I discovered four baby birds, hiding in the grass. I placed the truant family in an old robin's nest, in the crotch of a tree, about six feet from the ground. The chattering tirade ceased at once.

The following evening, a similar commotion was going on. I located three of the little birds at once, but could not find the fourth. As I searched, the parent birds kept flying a short distance ahead of me, then with a flick of their tails and a characteristic "scheck, scheck" they would alight on the clothes line, a hundred feet away. I gave up the search and started for the house. The birds followed and persistently continued to fly, back and forth, from me to the clothes line. I walked to the spot where they always alighted and there, on the ground, I found the other baby. As soon as I placed it with its brothers and sisters, the parents were perfectly satisfied.

Again on the following evening, almost the identical performance was repeated, except I sorely tried the old bird's patience, by appearing not to understand, but I found them persistent and well satisfied when all their babies had been put to bed.

Perhaps it was only instinct which caused the fond parents to favor me with their confidence and lead me to their truant babe, but to me, it seems like real sensible reasoning on the catbird's part.

Elderblow

By STEPHEN F. HAMBLIN

Director, Harvard Botanic Garden

THERE IS one flowering shrub that is found in nearly every part of temperate North America, at least where the soil is moist. Enormous flat clusters of tiny white fragrant flowers nod at you along the country roads in July, with clusters of black berries in September. This is elder (*Sambucus canadensis*), one of the familiar shrubs of swamp and wet meadow, and worthy of greater appreciation. There is really no other shrub in the wild with which you can compare it. The odor of the freshly broken twig any day of the year is as characteristic as a wet dog smell is of a wet dog. The stem has white pith between joints, easily pushed out, and no better natural means of making a popgun to shoot paper pellets or to squirt water can be found. Any country boy who has not worn down several elder bushes has not enjoyed his opportunities. Heavy pruning of this sort does not discourage elder, for it sprouts readily, and makes even bigger shoots next year.

The leaves are seven or more leaflets, sharply toothed, and opposite on the stem. Very few American shrubs have opposite compound leaves, and this fact, plus odor and pith, makes its identity certain. The tiny flowers are in enormous flat clusters at the ends of the shoots. There is a heavy odor about the blossoms, suited to hot afternoons in July, and the coolness of early evening as the dew begins to gather. Every flower should make a berry, for insects unnumbered and unnamed tumble over the flower cluster, dragging the pollen from one blossom to the next. Bees, butterflies and "bugs" of all kinds visit these cloying clusters. If you are a "bug" student never pass by an elder bush in bloom without looking it over for specimens.

The flowers are soon little green berries, and then black and ripe. The clusters no longer stand erect, but hang in weighted loads for a long time. Evidently they are intended for some purpose. Birds eat many of them and plant elder seeds all over the swamp. Children do eat them, but the flavor is not as good as of the blueberries on the nearby bush. They look better than they taste, and the seeds are much in the way for rapid mastication. For staining hands and clothes they are much more rapid than blackberries. In pioneer days they were made into pies in imitation of blueberry, and when properly flavored you have another good one of the great American dessert. But the seeds must be taken out before the pie is assembled, and the juice thickened, or when the pie is opened the contents will be colored water of good flavor, filled with sand-like seeds. A seedless berry would be a great convenience. Yet the pie is now a rarity, though the bushes now shake violently every September, so some use must still be made of the berries.

PHOTOGRAPH J. HORACE MC FARLAND CO.

IN JULY THE ELDER BLOSSOMS NOD

They own a heavy odor suited to hot afternoons and the evening cool.

Besides its practical uses, from popgun to juices, the plant has ornamental values. It is the one shrub of showy flowers during our hottest weather. To look at an elder bush in bloom on a hot afternoon, or to smell its sweetness at evening, is as satisfying a pleasure as the enjoyment of any natural object affords. Then the elder bush is cultivated in our yards and gardens—possibly. Though it makes jungle-like thickets along brook and swamp, it grows very well in soil somewhat dry. It soon looks unhappy, however, when placed close to house foundations, where drainage is too perfect, and it wilts in hot weather. An elder bush in a dry yard is as out of place as a duck on a city pavement.

Though it has a native grace when in the fence corner or along the country lane, it is a sad affair when placed among more sophisticated shrubs. It

is coarse in texture and very bare in winter—a clump of shapeless sticks. Winter killing of the ends of the twigs is common, and snow avalanches off the roof break the brittle twigs. Sympathetic pruning is necessary every spring to give it the polish of the other shrubs. It has something of the awkwardness of sumac and never quite has a domesticated look. It is none the less pleasing because of its rural atmosphere, yet nature and art are less satisfied when it is dragged up to the front yard to show off. Yet it has been much in cultivation, for there are garden forms with leaves cut to shreds, or tinted yellow, and with fruits greenish when ripe, or much larger than the average. The plant with cut or colored foliage is often seen limping through life in a dry corner in some garden. Doubtless the plant could be induced to do many garden stunts were there any point in the performance.

PHOTOGRAPH J. HORACE MC FARLAND CO.

SEPTEMBER BERRIES OF ELDER

They look better than they taste but can supply a delicious pie.

The cultivated bushes may not be the American plant, but the European elder, (*S. nigra*) more tree-like, the leaflets five, and the elder odor very strongly unpleasant. The fruit and flower clusters are smaller and appear earlier; it is far less lovable than our plant, and often attempts social position by having leaves yellowed or shredded. These two species inhabit the two northern continents, but our western states have *S. caerulea,* which differs mostly in the white bloom on the blue-black berries.

Some elderberries have a red color. This is our scarlet elder (*S. pubens*) found in the high rocky slopes of our hills and mountains. The pith is *brown,* the leaves thick and downy, dark green, and they unfold very early from fat purple buds. The yellowish flowers are in a dense cone in early May, and the triangular cluster of red berries hangs ripe in late June—one of the earliest of bird fruits. It is easy to remember that this bush is in ripe fruit when our swamp species is in bloom, and the two may be planted together to get this contrast. Seeing fruit of one and flower of the other on the same day is an unforgettable lesson in elder.

There is also an European species (*S. racemosa*) more slender in twig, with flower and fruit cluster more rounded, but the real difference to notice is the lack of down on the leaves. The European plant is quite common in our parks, evidently because it is European—for the American is a more pleasing shrub—but to see it you may have to hike to the hills. The western states and the Orient have similar red-fruited kinds, but they add no charms to the one of the hills of northeastern North America.

The elder bush is an easy lesson. There are two sets. The black fruits come from late June-July flowers at the time the red berries are ripe on the other bush; the first with white pith, the other with brown. Both are Nature's bushes, and not intended to be dragged into gardens to parade their virtues in this effete atmosphere.

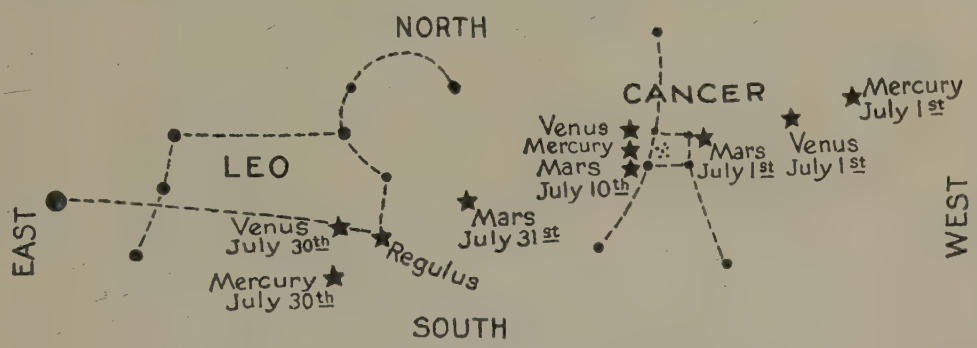
No adequate compilation has ever been made of information on organizations of nature lovers, nature study activity, facilities of museums, nature work of a wide variety of groups and many allied interests. Such a compilation the American Nature Association proposes to make and to publish in an attractive and complete volume. All organizations and institutions that have nature and outdoor interests are earnestly asked to cooperate by providing information on their work, scope and personnel. Please write to The American Nature Association, 1214 16th St., Washington, D. C.

The Evening Sky in July

By ISABEL M. LEWIS

JULY is an eventful month in the evening sky. Shortly after sunset the five brightest planets—Mercury, Venus, Mars, Jupiter and Saturn—will all be above the horizon at the same time for the greater part of this month. Then, on the evening of July 10, Mercury, Venus and Mars will stage a close meeting when the three planets will be so near together that they might almost be mistaken for a triple star.

Get out your opera glasses, or, better still, a small telescope if you have one, and search for these three planets on the evening of the tenth of July soon after sunset over in the northwestern part of the sky not far from the horizon. You will not need glasses or telescope to locate Venus even in the brightness of the twilight because it is so brilliant, but you may need them to find Mercury so close to Venus on that date that the two appear almost as one to the naked eye. Mars, also in line with the other two to the south of Mercury and but a quarter of a degree distant, will be more difficult to find. Mars is now not as bright as even a second magnitude star, and it will be impossible to pick it up in the twilight glow without some optical aid.



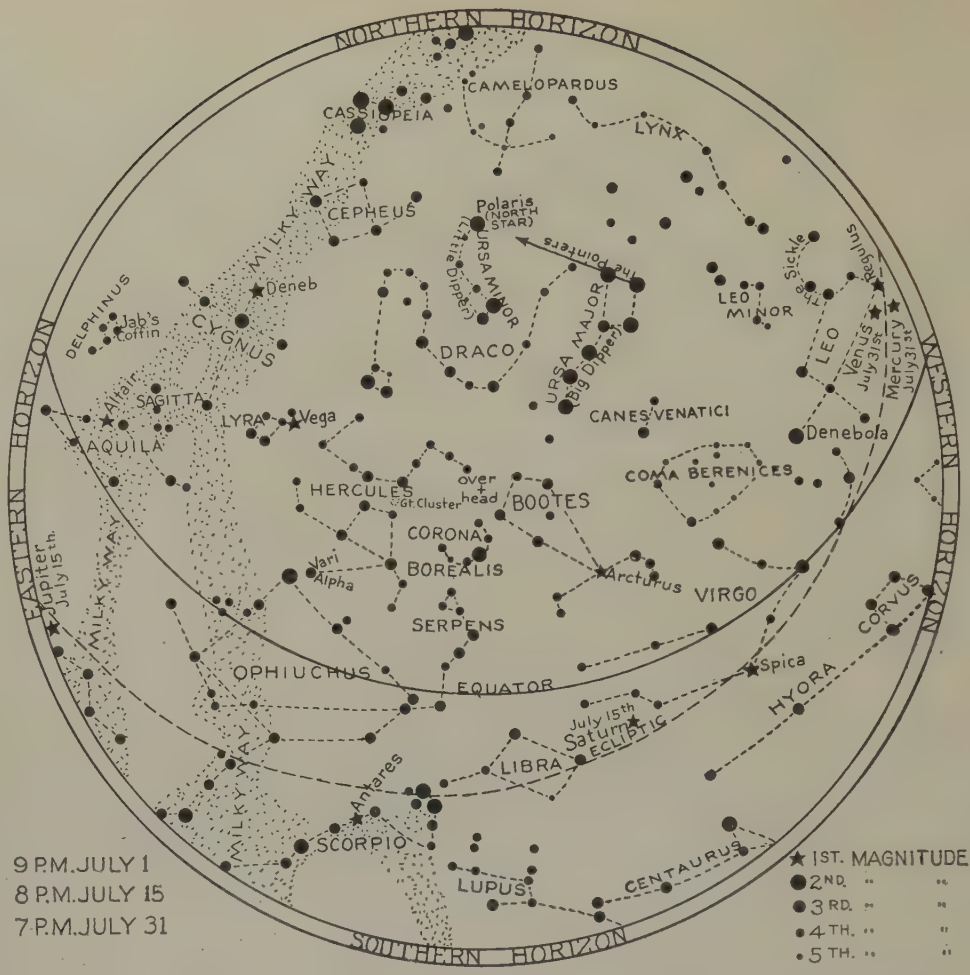
THE PROGRESS OF THE PLANETS DURING JULY

Though the three planets appear so close together in the sky, as viewed from our planet, at the time of their conjunction with each other on the evening of the tenth of July, they are actually very far apart in miles. All three planets are now on the far sides of their orbits from the earth. Mercury, on that date the nearest of the three to the earth, will be about 105,000,000 miles from the earth when in conjunction with Venus on July 10. At the same time Venus will be at a distance of 146,000,000 miles from the earth and Mars at a distance of 239,000,000 miles. Mars is increasing its distance from the earth and drawing in toward the sun so it will be increasingly difficult to find it in the twilight during the month. Mercury and Venus, on the other hand, are now approaching the earth in their orbits. Venus is moving steadily eastward and getting in better position for observation as it appears higher in the western sky each evening after sunset.

Mercury is the most difficult of all the planets to observe because ordinarily it is so close to the sun that it is not possible to find it in the glare of the sun's light. It is only at or near the time of its "elongations" when it is farthest east or west of the sun that it is visible in the evening or morning twilight. When it is east of the sun it is visible in evening twilight and when west of the sun in the morning twilight. This month Mercury will be in an exceptionally favorable position for observation after its conjunction with Venus on the evening of the tenth of July. It will reach its greatest eastern elongation on July 28 when it will be more than twenty-seven degrees east of the sun. This is within one degree of its greatest possible distance from the sun and great enough to enable us to pick it up easily in the twilight after sunset. Then, too, Mercury is coming into conjunction with Venus again on the 30th of July when it will be a little more than three degrees south of Venus so we should be able to locate Mercury easily at that time with the aid of Venus.

Anyone watching these three planets this month with the aid of a small telescope or field glasses might imagine they were playing tag or running a race over there in the northwestern sky after sunset. All three move eastward during the month from Cancer into Leo but all are moving at different speeds with respect to each other and the earth. Mars, the slow-moving one of the trio, is at the beginning of the month farther east and higher in the western sky than the other two but before the month is over has fallen far behind the other two planets which passed him on July 10.

On the first of July Mercury is nearer to the western horizon than either Venus or Mars and too near the sun to be visible, but rapidly forges ahead



TO USE THIS MAP HOLD IT OVERHEAD WITH TOP TOWARD THE NORTH

until on the tenth it passes both Venus and Mars. It then continues to draw farther and farther eastward and appears higher in the western sky each evening until the twenty-eighth when it gets as far from the sun as it can. After that it has to return toward the sun and the western horizon allowing Venus to pass it in her steady eastward motion on the thirtieth. Mercury is about equal in brightness to Vega now visible in the northeast and Arcturus now west of the meridian. It should not be a difficult matter, then, to locate it even in the twilight when one knows just where to look for it.

Saturn, which has been above the horizon in the evening hours for some time, is still in Virgo and changes its position very little with respect to the stars this month. It has been moving slowly westward but on the twelfth of this month it becomes stationary in position, as viewed from our planet, and then begins to swing slowly backward toward Libra to the east.

Jupiter, which is now rising over in the southeast in Sagittarius, will be in opposition to the sun, or on the meridian due south, at midnight on the tenth of July. It will then rise at sunset and be in view all night. It will be seen, then, that on the tenth of July when Mercury, Venus and Mars are holding their close conjunction over in the northwest soon after sunset Jupiter and Saturn are also on the scene but far away in the southeast and southwest respectively. On this date Mercury, Venus and Mars will set about an hour and a half after the sun.

Among the constellations, this month, there is in particular Scorpio, The Scorpion, which contains the much talked of Antares (meaning Rival of Mars). This star, which is estimated to be at a distance of three hundred and fifty light years from the earth and therefore so far away that its light takes three and a half centuries to reach the earth traveling at the rate of 186,000 miles per second, is, so far as is known, greatest of all the stars in size: Its diameter has been found to be 400,000,000 miles. There are probably other stars, however, in far-away regions of interstellar space that equal or surpass Antares in size. It is only that Antares happens to be the largest star that we are acquainted with up to the present time. Antares, you may know, has a small green companion star which it takes a fair-sized telescope to reveal easily.

Antares is supposed to be the heart of the Scorpion. The constellation Libra, next to Scorpio on the west, was originally a part of the constellation of Scorpio, representing the claws of the creature, but the two finally became independent constellations of the zodiac. Libra is supposed to represent the scales of Justice.

There is an old myth to the effect that Scorpio was the monster that caused the runaway of the steeds of Phoebus Apollo when he attempted to drive the chariot of the sun across the heavens against the wishes of his father. There is also the story that the Scorpion stung the warrior Orion and that is why Orion always disappears in the west as the Scorpion rises in the east. In the tropics Scorpio is one of the most brilliant of all the zodiacal groups, and there it appears high in the heavens.

Bringing Up Bluebirds

By MARY WOOD DALEY

ONE APRIL in one of the nest boxes on the grounds of our farm-school, a pair of bluebirds had built their nest, and hatched their young successfully. One day we had watched the parent birds flying in and out of the house with food; the next day, late in the afternoon, we found English sparrows in possession. As we approached the box we found one baby bluebird on the ground, cold to the touch, but still breathing. One young one, quite dead, hung impaled on a nail in front of the box. No parent bluebirds could be seen. The sparrows were busy carrying nest materials into the box. We opened the box to find a great clumsy, characteristic, English sparrow nest crowded in on top of the bluebird nest—and there, buried alive, were three featherless bluebird nestlings!

We carried them, nest and all, into the house. The little one found on the ground revived when placed on a hot water bottle. Their eyes were still unopened; they looked very helpless, naked and ugly in their nest. But a magic note, the imitated call of the bluebird tribe, made these little blind things stretch up their scrawny necks and open their big yellow-rimmed mouths. We were ready with plenty of earth-worm food. With small tweezers we placed the worms way down into those gaping throats.

READY FOR BREAKFAST

With small tweezers the worms were placed way down the gaping throats.

The sparrows had evidently pecked at the young birds, for all but one were scarred so badly that, as feathers grew, these spots were bald. These marks gave us easy means of individual identification.

Their food was mostly earth worms. Two hundred and thirty worms a day were consumed besides meal worms and other insects gathered by the children—ants, spiders, lady bugs, millers, and various larvae and pupae. Owing to a severe drought during June, their food was sometimes hard to secure. Then we used hard boiled egg, which seemed acceptable. Three kinds of food they refused to take—garnet-colored earth worms dug from manure piles or rotting logs, rose beetles, and May beetles. They were fed every half hour. The children worked untiringly to provide for the baby bluebirds.

We watched each sign of growth with keen interest. After a few days their eyes opened, more feathers began to show. Soon they were tumbling out of the nest, so we placed them in a small screened box. When they had learned to fly and perch, at the advanced age of three weeks, a large screened cage was provided. Of course the cage had to be carried about. Many a lesson those little birds gave us all, in the classroom, in the cottages, on the lawn.

Part of each day when the wings had developed they tried their skill flying in our rooms. They knew no fear. The head, hand or shoulder of any one of us was a perch for them. They liked to swing on the door of the cage, then to fly to the bureau or wardrobe, or to sit snuggled close together in the sunshine on the window ledge. How would you like to be combing your hair and to see, in the mirror, a young bluebird alight on the top of your head? How would you like to be reading, and feel, suddenly a bird on your shoulder, another on your book?

At dusk, when they were well fed, all four would hop to the highest perch in their cage and crowd together against one side of the box. The little fellows left on the outside end of the row would

invariably edge away from the crowd, hop or flutter above his brothers, and wriggle down between them. Then the next one left on the end would repeat the experiment. This mild struggle for the cosiest place continued until they were all too sleepy to move, when, with soft twitterings, they would at last go to sleep.

Soon came the time when they must try their wings in the treetops. We left the cage on a table on the farmhouse lawn. Two children took turns watching nearby, keeping note of all that occurred. For two weeks the little birds were entirely dependent on us for food, flying down every half hour to be fed. At night we brought them indoors, in their cage.

We banded them, placing on one leg of each bird an aluminum band provided by the United States Biological Survey. Each band is numbered. If the birds are ever found and notice sent to Washington some trace of their adventures may be known.

When we saw that they were learning to catch insect food for themselves and so were becoming independent of our care, we let them stay out night and day, keeping a supply of earth worms and a dish of water on their cage on the lawn. We still kept watch for two more weeks so they should never come in vain for food.

THEY KNEW NO FEAR

Perfect confidence in human beings seemed to come to them naturally.

BLUE BIRD ON A PERCH

They soon learned to fly and at that time they were banded.

Slowly but surely they joined the great band of free bluebirds.

About the middle of June one disappeared. We shall never know how or where or why. Was he captured by some heartless person, who took advantage of his tameness, or did he fall prey to some natural enemy? A third possibility, least likely, is that he became independent of our food supply and of his brother group.

Each day the birds showed more independence. We saw them catching bugs on the bark of trees, on the ground, in the air.

They stayed about the farm until October. Many a surprise they gave those who were there, descending suddenly upon them, on lawn mowers, in window sills. Once during a supper party on the lawn one bird lit on the head of the hostess. She refused to have him fed hard boiled egg on her head, so he was driven off. Soon one alighted in a little boy's butter dish. Then all three landed in and on a cornstarch pudding garnished with raspberries. Each bird was given a berry and flew away contented.

They were both wild and tame! How has Mother Nature cared for them? Have they survived the attacks of bird enemies? Will they ever return to us?

R. Bruce Horsfall has written an article to go with his beautiful colored painting that will appear in the August issue of NATURE MAGAZINE. The subject is that delightful and lovable little bird—the Ruby-Throated Hummingbird.

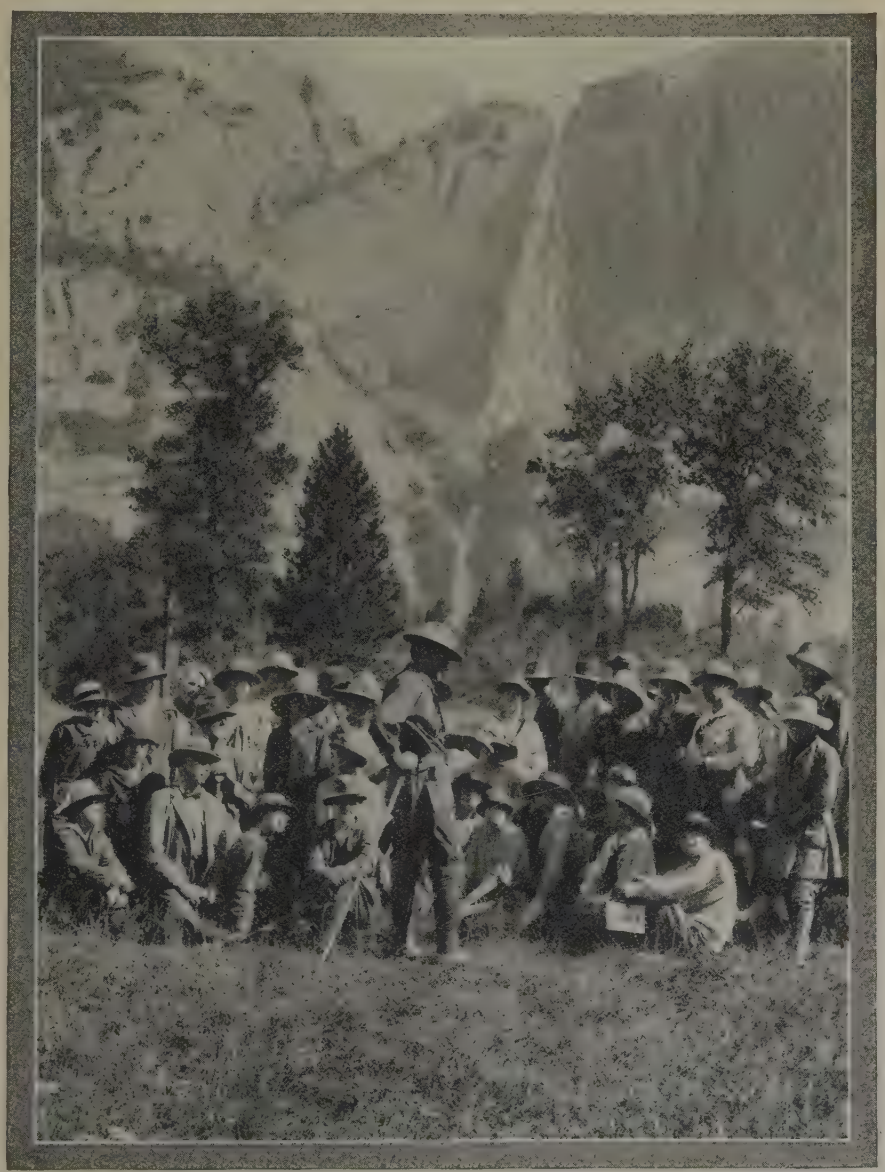
Nature Guiding

By HAROLD C. BRYANT

In Charge Nature Guide Service, Yosemite National Park

WHAT better definition of nature guiding can we find than that given by Enos A. Mills, a pioneer in the field: "Nature guiding is helping people to become happily acquainted with the life and wonders of wild nature."

In America, the first attempts at satisfying the desire for information regarding the living things seen along the roadside were made by such organizations as Audubon societies, museums, botanical and zoological societies and hiking clubs. One of the first private ventures in nature guiding was by Enos Mills in Rocky Mountain National Park. Mr. Mills found that his guests at Long's Peak Inn were very receptive to natural history lore and he sought to furnish nature guiding as a feature of entertainment. The response from old and young was so immediate that he became sufficiently impressed with the work to write about it. Full credit must be given Mr. Mills for the first adventure in nature guiding, as such, in a National Park and for originating the term to describe this type of guiding as distinct from the usual horse-wrangler type furnished. His "trail school" was the first of a group continually increasing in number.



STUDYING NATURE WITH YOSEMITE FALLS IN BACKGROUND

Our National Parks abound in a wealth of Nature material that the visitor wishes to know.

In a few instances, field excursions comprise a part of the nature study program in the schools. The Los Angeles City Nature Study Department has introduced trips afield and annual trips to mountains and seashore form part of the program. These larger excursions number thousands, and yet are so organized as to bring both profit and pleasure to the children. At the present time many nature clubs and hiking clubs offer field trips and thousands are thus led to study nature first-hand. Last year more than 2,000 persons attended field trips offered by the San Diego Museum of Natural History, but similar records by other museums are few in number.

In 1919, the American School of Wild Life Protection was established at McGregor, Iowa. This school has held regular summer sessions with emphasis on both class and field work given by specialists. A nature lore school founded by Dr. William G. Vinal, of the Rhode Island College of Education on Cape Cod is another recent venture. Its term of one week seems wholly inadequate but its emphasis on "learning by doing" is to be commended.

Boys' and girls' summer camps

throughout the United States have found it to their advantage to offer trips afield under a competent guide, and early demands for trained field naturalists came from this source.

Nature guide work in the summer resorts of California really had its beginning in 1918 when the California Fish and Game Commission sent its educational director to Yosemite National Park to deliver a number of lectures. As a stimulus to further interest in wild life, field trips were offered which proved very popular. In reality, the concept of nature guiding was a product of the World Survey which brought the idea from Europe and planted it in America.

This work caught the attention of Stephen T. Mather, Director of National Parks, and in the spring of 1920, through a cooperative arrangement with the California Fish and Game Commission, the National Park Service instituted a "Free Nature Guide Service" in Yosemite National Park. The outstanding aim of this service has been to awaken visitors in the park to their natural history opportunities, to teach them to see and appreciate living things they have never seen before and to hear sounds never heard or understood before. Interest in living things is usually present which gives a good basis for the work. It is needless to point out that increased knowledge of things seen improves one's summer vacation and, of course, adds to one's appreciation of Yosemite and other national parks.

NATURE KNOWLEDGE MAKES VACATION WORTH WHILE
Group in Yosemite National Park listening to the nature guide.

To attain this aim the following methods have been employed: Lectures and campfire talks at the different resorts in the park, designed to stimulate interest in natural history and conservation of natural resources. Campfire talks were often direct answers to the usual questions asked.

Trips afield designed to give first-hand knowledge of the wild flowers, trees, birds and animals encountered on a two-hour walk along a trail. Trips for adults were scheduled for the morning and trips for children for the afternoon, with longer all-day trips on Saturdays.

Office hours designed to furnish an opportunity to have questions regarding the park and its natural history satisfactorily answered.

A small nature study library of reference works.

Flower shows designed to furnish a ready means of recognizing and naming the wild flowers and other plant life of the park.

In 1921 a nature guide service was established in Yellowstone National Park. Emphasis has been placed on evening lectures by trained scientists, the community centers affording a unique opportunity for development along this line. Every center is furnished a nature guide lecture each evening. A museum attracts hundreds of visitors. Field trips do not form so important a part of the program.

Glacier National Park inaugurated a nature guide service in 1922 with the aid of Montana State University. Here, also, emphasis was placed on a lecture program. The same year saw a beginning made in Mount Rainier and Sequoia National Parks.

Such were the beginnings of an educational proj-

ect now organized under an Educational Department of the National Park Service with a program calling for a natural history museum, park naturalist and nature guide service in every national park.

There is abundant evidence to show that thousands have been awakened by the Yosemite Nature Guide Service to the pleasure to be found in nature study and, with the proper inspiration gained, have gone afield with eyes and ears open to see and to hear more completely themselves and to pass on enthusiasm to others. It is also plain to see that thousands, having seen "game hog" pictures and had pointed out to them the necessity for conserving the natural resources, have more actively espoused the cause of conservation.

OFF TO STUDY NATURE IN THE PARK

Vacationers assured of seeing and learning much on their trip.

Who will not agree that, "Let the interest be keen, new facts will open up; new trees will grow; new birds will fly; new fish will swim; and then will our galleries be filled with new and glorious pictures of things worth seeing." And certain it is that when one has learned to "read the trailside as one reads a book," under instructions from a nature guide, his gallery will soon be filled with pictures each standing for an experience never to be forgotten.

National Conference on State Parks

ESTABLISHMENT of additional parks "wherever conditions justify, so located as to widen the scope of the National Parks system to the end that people of all sections of the country may have easy access to outstanding areas where the beauties of Nature shall be preserved in their original state for the education and enjoyment of all future generations," was urged in a resolution adopted at the fifth annual meeting of the National Conference on State Parks held at Skyland, Va., May 25 to 28.

The site selected for this meeting was one of beautiful scenic interest and in the territory embraced by the proposed Shenandoah National Park. Delegates representing park and outdoor organizations, forestry groups and allied interests were present at the meeting. The American Nature Association and the American Tree Association were represented by Arthur Newton Pack, secretary of both Associations.

One of the most important and interesting resolutions adopted by the conference was a statement of policy governing the "use of transportation ways and facilities in connection with the development and management of public parks." The resolution emphasized that travel is an incident not an objective in a park, urging that "transportation routes should be designed to promote the highest use of the natural recreational resources of the area; rather than the resources being developed to promote travel." An adequate system of transportation routes constructed to a standard suitable for the service required is urged for every park, but the plan of park service and the development of that service should be determined prior to planning the transportation system. It is pointed out in the resolution that each park is a distinct problem in the matter of transportation and that conservatism should prevail in this connection. The statement advocates leaning toward the side of not opening virgin areas of natural scenery to automobile or other modes of rapid transportation in cases where doubt exists.

The conference went on record in favor of "abatement of the billboard nuisance," particularly in so far as it encroaches seriously on scenic localities. The Committee on Educational Relations of the Conference presented and secured the adoption of a resolution recommending the creation of a museum of local natural history in every state park and soliciting the cooperation of local educational leaders in bringing this about.

The meeting of the conference was marked by tours and hikes to various points of scenic beauty in the locality. Several of the sessions were held out-of-doors and there was a variety of interesting incidental entertainment provided.

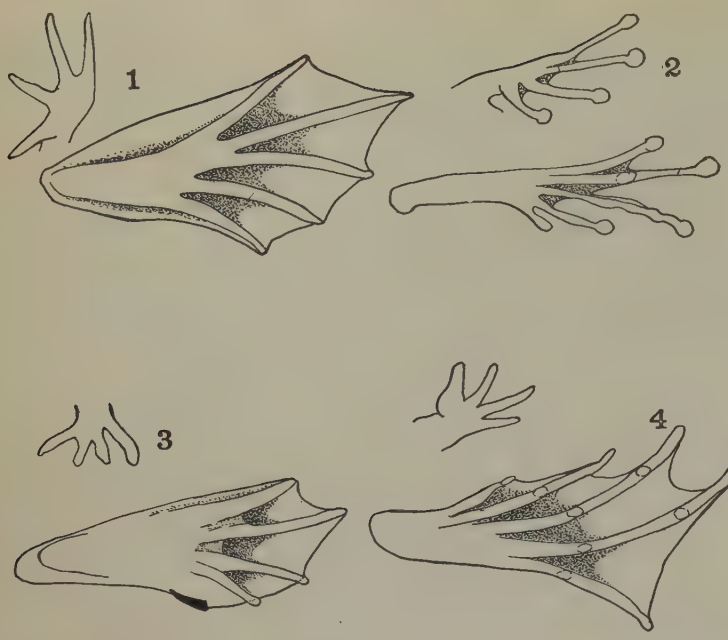
John Barton Payne was reelected as chairman.

Practical Nature Puzzles

By E. LAURENCE PALMER

A GRADUATE of a city high school once visited a beaver dam with me. Said he, "Beavers live on land and water, therefore they are amphibia. Amphibia lay eggs. Where do these beavers lay their eggs?" It is true that beavers are amphibious but they are not amphibia. The presence of hair on beavers would classify the animals as mammals. Amphibia do not possess hair. Some amphibia like the salamanders are popularly known as "lizards." This is highly misleading since lizards are reptiles and possess scales while amphibia are scaleless. As anyone who has handled a frog or salamander realizes, amphibia are naked-skinned creatures. Adult frogs are generally tailless and adult salamanders tailed. When most of us think of frogs we also think of ponds. This may be misleading since possibly a majority of frogs and toads spend most of their lives away from the water.

The nature of the hind feet of frogs and toads often tells us much of the habits of the bearer of these feet. Numbers one to four show the feet of a number of these creatures.

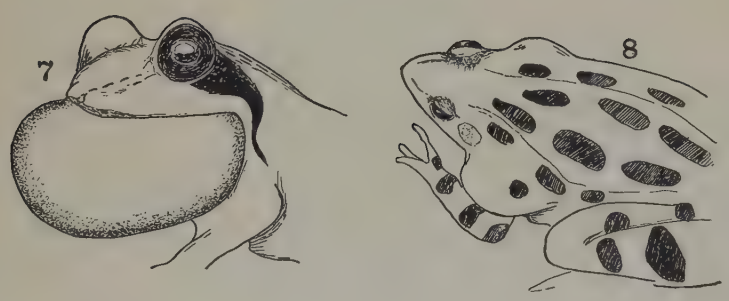


1. Which of the feet belong to a tree-frog that is able to cling to trunks and branches of trees? ( )
2. Which of the feet belong to a spade-foot toad that is well fitted to dig into the ground with its hind feet? ( )
3. Which of the feet belong to a bullfrog that does not leave the water? ( )
4. Which of the feet belong to a meadow frog that spends the summers in the fields and meadows rather than in the ponds? ( )

Most amphibia when young get their air through gills from the water. Numbers five and six show an adult and immature salamander.

5. Which of the pictures probably represents the adult salamander? ( )
6. Which of the pictures probably represents the larval or immature salamander? ( )

Frogs and toads are often pleasingly musical. The males are generally more talented than the females which they go to waterways to court but each kind or species of frog or toad has a call peculiar to its kind. Some are mere grunts; some are loud strong calls. Frequently the smaller frogs like peepers and cricket frogs may be heard much further away than can the larger frogs like the pickerel frogs. Vocal sacks frequently show when frogs and toads are calling as indicated in numbers seven and eight.



7. Which of the figures represents a pickerel frog that gives a sort of grunt? ( )
8. Which of the figures represents a tree-frog that gives a loud strong call? ( )

Frogs congregate in ponds in early spring and summer to mate and lay their eggs. Generally they seem to show good judgment in selecting a site appropriate to the nature of the season as shown in numbers nine and ten.

9. Which of the eggs were probably laid by the bullfrog that mates and lays eggs when the season is well advanced as in late spring or early summer? ( )

Answers to June Puzzles

The answers to the puzzles given last month are as follows: Star-gazer, 3; blind fish, 1; killifish, 4; sunfish, 2; pike, 5; half-beak, 7; sturgeon, 6; sucker, 10: bullhead, 12; hagfish, 8; sheepshead, 11; garpike, 9; sucker, 13; pickerel, 14; sunfish, 16; minnow, 15; right-side up, 17, 19, 20; fifth year, 21; fourth year, 22; 23, six years; angler fish, 25; remora, 27; flying fish, 24; perch, 26; flounder, 30; globe fish, 28; trout, 29; bullhead, 31; shark-sucker or remora, 27.

10. Which of the egg masses were probably laid by the pickerel frog that mates and lays its eggs early in the season? ( )

Salamanders may spend their entire lives away from water, their entire lives in water or part of their lives in water and part of their lives on land. Once they have lost the external gills which they may have in an immature stage it is not their custom to again bear external gills. They may return to the use of gills after living even a year or so on land but these gills are generally not external gills. Numbers eleven to thirteen show three salamanders.

11. Which represents an immature newt that lives on the land? ( )
12. Which represents a mature newt which lives in the water? ( )
13. Which represents a mature mud puppy that lives its entire life in the water? ( )

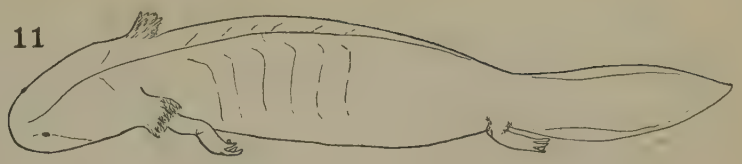
The eggs of frogs and toads usually hatch into tadpoles. Some of these require a few weeks or months to reach a size when they may transform into the adult form and others may take a year or two. The tadpoles represented in numbers fourteen and fifteen are bullfrog and meadow frog tadpoles as they might be found in mid-summer or late summer. When these tadpoles transform the transformed frogs are about the same size.

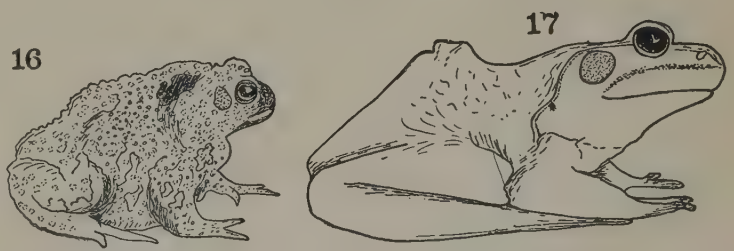
14. Which of the tadpoles is a bullfrog tadpole that requires a year or two to reach transformation size? ( )
15. Which of the tadpoles is a meadow frog tadpole that requires a few months to reach transformation size? ( )

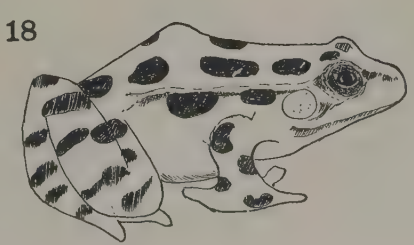
Adult frogs and toads have many enemies much as do the eggs and tadpoles. Markings which render them inconspicuous save many of these adults from their enemies. Numbers sixteen to nineteen represent some of these adults.

16. Which represents the meadow frog that lives in the fields among the grasses? ( )
17. Which represents the common toad that lives along roadsides and over broken ground? ( )
18. Which represents the bullfrog that lives in the water as an adult as well as when immature? ( )
19. Which represents the tree-toad that lives safely on exposed trunks and branches of trees? ( )

In conclusion let me state that generally speaking frogs and toads and salamanders are highly useful forms of life from our viewpoint and are worthy of much protection and encouragement.







Nature Study Review

E. Laurence Palmer, Professor of Rural Education at Cornell University, editor of the widely known Cornell Rural School Leaflets and an outstanding leader in the field of Nature Study, has joined the staff of the American Nature Association. Beginning July first, he will become the director of the Nature Study work of the Association and of the Nature Study Department of NATURE MAGAZINE. Mr. Palmer will direct the work of making a complete survey of the Nature Study situation, the publication of frequent bulletins on the subject and the progress of the survey and whatever work appears necessary and advisable in the publication of school and camp leaflets, the formulation of courses of study and other allied work.

Bird Study in Honolulu

By Anna Botsford Comstock

BIRD STUDY in Honolulu reminds one of the library of an old professor which consisted of two thousand volumes, fifteen hundred of which were copies of a book which he himself had written. The first impression one receives in passing through the shaded streets and beautiful parks of Honolulu is that birds are plentiful; but as soon as one begins to identify species, the fact is soon apparent that there are only two kinds present, the cosmopolitan English sparrow and the mynah birds.

Formerly there were beautiful and interesting land birds on the mountain slopes and shore plain where Honolulu now stands. Fifty-six species have been listed of the passerine birds on all the islands of Hawaii; of these, sixteen species are extinct and many others are rare and confined to limited localities on one or another of the islands. Some species with bright yellow or red plumage owe their extinction or reduced numbers, to the magnificent feather robes worn formerly on state occasions by the monarchs ruling the islands. However, other causes like cats introduced and allowed to run wild, the mongoose introduced to kill rats, the latter being still plentiful while the bird species nesting on the ground have been practically exterminated, and still other less understandable causes have reduced the bird population to the extent that in this Island of Oahu one must penetrate the most remote mountain forests to find a native species.

The mynah is by far the most interesting of the introduced species. It is at first glance very much like our eastern robin; its size and its habit of hunting food on the lawns make the resemblance striking. However, a second glance reveals many dissimilarities. The head is almost black, the beak, the legs, a triangular crescent just back of the eye are bright yellow; the back is a beautiful tawny brown as sleek and as rich as that of the cedar wax-wing; the throat is dark, the breast tawny, the underparts white. The wings and tail are almost black; when the bird is at rest a bit of white shows at the tip of the tail and two white spots on the margin of the wing; the lower side of the tail is white with a V-shaped black stripe near the margin. The moment the mynah takes wing, great is the transformation! The middle of the wings show a broad expanse of shining white above and below and the pointed tail has a large patch of white on either side bordered with black. Its vividly contrasting colors strikingly recall the mocking bird in flight.

The mynah has a peculiar and awkward gait; it stalks about, taking long stiff steps with its yellow legs much in evidence. Its stride is more ostentatious than that of our blackbirds. It can run and occasionally adopts a funny hippity-hop on one foot as a method of hurrying.

The mynah builds a bulky nest under the eaves of houses or on the timbers of sheds or in the forks of branches; the eggs are blue and about the size of the robin's. The mynahs are sociable and exceedingly conversational. They have an amazing variety of calls and notes considering the monotonous quality of their chatter. While some of their notes are shrill and sometimes harsh, there is an oriole richness in others. Their song is reminiscent of that of the cardinal and of the robin; it is a musical "te cher ee o, te cher ee ah"; the calls vary greatly: "kreeo, kree; wick a wick; cheo, cheo, chew; hear ye; per kee; kack kack"; and when they see a cat or dog or any other offensive creature they give a "shrp ckurr" very like the catbird's note of remonstrance.

The mynah here is probably a descendant and possibly a variety of the mynah of India. It was introduced here many years ago by Dr. Wm. Hillebrand when the entire agriculture of the island was menaced by cut-worms, the young of a noctuid moth. The mynahs cleared out the cut-worms in record time and naturally multiplied rapidly. Now, there being few cut-worms they feed upon other insects living on the ground or upon the trees which they frequent; they find garbage

palatable and will eat almost anything they can find. At this moment one on our lawn is "getting away" with a piece of cocoanut, pecking the meat so vigorously that it lifts the entire fragment, twice the size of its head, then thumps it down in a most business-like manner.

However, the most interesting of all the performances of the mynahs is their method of going to roost at night and waking up in the morning. All the birds of a given area choose one banyan tree in which to congregate and sleep. An hour before sunset the clan begins to gather, but the greater numbers come soon after the sun has disappeared; from all directions they come by twos or in flocks of four or six with a grand show of flashing white wings, and each making appropriate remarks along the way. Long after sunset when the temperamental tropic twilight suddenly embraces the night, the last dilatory stragglers come in swiftly, sure, as are all the others, that somewhere among the multitudinous branches of the enormous tree there is to be found a twig just the right size to roost upon and a broad thick leaf for a cover.

Great is the commotion and greater the racket as the hundreds of mynahs settle down for the night; the noise can only be compared to the shrilling human voices at a large and crowded reception; the only thing like it in the east is the chatter of our chimney swifts as they shoot down some large chimney; but the noise they make is little compared to the vociferous mynahs. Darkness falls before the din tapers off into a few scattering chirps. The awakening in the morning occurs shortly after the sunrise gun at a nearby fort booms for six o'clock. We are two blocks away from a banyan roost, and to us the awakening concert seems musical and not unlike the chorus of our spring peepers; but those who live near the banyan tree aver that a chorus of alarm clocks would not be more disastrous to morning naps than the mynahs' greeting of the sunrise. But this does not last long, for in about fifteen minutes after we hear the first chorus, we hear our own mynahs calling "te cher i o, te cher i a" from the cocoanut palm above our window and we know by this token that the mynah day has begun.

The mynahs are practically harmless; some have thought that they drove the native birds away, but the English sparrows would have done that anyway; and those who know, claim that up in the mountains the mynahs live in peace with the native birds since there is no competition between them for food or sites for nests. It is known also that the mynahs have helped to spread the beautiful but hated weed, the lantana; however, the Chinese turtle doves have been the greater offenders in this invasion and would have spread their beloved lantana far and wide without the aid of the mynahs. On the other hand, the mynahs have one supreme virtue besides that of exterminating cut-worms, they have taught the English sparrow to keep its place; the modest and chastened demeanor of these sparrows here is a tribute indeed to the mynah birds whom they recognize as their masters.

As we drive along the mountain roads here in Oahu we often see the Chinese dove, rich purplish brown in color with two great patches flaring out in its tail as it takes flight; and rarely enough we hear the thin song of the Chinese thrush in the deep woods; and over in the rice fields we see small flocks of the sparrowy rice birds; but these all make small impression upon our minds. When we think of the birds of Honolulu we shall always see the mynah's flashing wings.

Nature Study Urged

Provision for Nature Study in all the schools of Ohio will be sought by the Conservation Division of the General Federation of Women's Clubs. At a meeting of this division under the chairmanship of Mrs. W. W. Milar, of Akron, a resolution was drafted urging Nature Study in all schools from the first to the sixth grades and supervised by a competent authority. This resolution was presented to the State Federation and approved. The division also secured the approval of a resolution lining the State Federation solidly and actively behind the movement for the protection of wild flowers in the state.

Nature in New York

Next January a new five-story building will be completed beside the American Museum of Natural History. It will be the School Service Building, dedicated to the tremendous work that has grown up of providing natural history visual education material to the public schools. The extent of this activity can be understood when it is cited that in 1924 there were 567,160 lantern slides of natural history material shown to some 5,000,000 children; 309 motion picture reels unfolded before about 115,000 children and 206 special lectures provided for 144,000 youngsters. This indicates only a small part of the Museum's work in this direction but it does indicate the great growth of Nature interest.

Michigan Audubonists

Nature study in the schools was actively urged by several speakers at the recent annual meeting of the Michigan Audubon Society as reported in the quarterly news letter of that Society. Miss Mabel I. Richards, principal-elect of the Fremont Demonstration School at Battle Creek, declared that "it should be a vital, underlying part of the course of study, and will create a desire for those forms of expression that lie within it, as reading, writing, art, geography and so forth." The annual meeting was the most successful yet held, and the organization is growing in numbers and influence.

Pollen and Hay-Fever

Hay-fever season is here. Sneezing, reddening of the eyes, and other symptoms of the well-known summer discomfort have again appeared. According to Dr. E. M. Gress, botanist of the Pennsylvania Department of Agriculutre, inoculation will go far toward reducing the susceptibility of persons who suffer every summer. He recommends the patients be inoculated with an extract of the substance from pollen which causes the irritation to the nasal passages.

The malady, said Dr. Gress, is caused by the dust-like pollen grains of certain flowers. They are carried by the wind and are not carried extensively to hay-fever victims by insects. Usually the damage is done by pollen from the less conspicuous and the more common flowers and weeds. He lists Kentucky blue grass, timothy, red top and rag weed as the principal sources of the pollen that so greatly distresses some unfortunate persons every summer. These plants are common on the average farm and they grow unchecked in waste places and vacant lots.

Hints to Nature Readers

By ELIZABETH K. PEEPLES
Instructor of Natural History, Washington, D. C.

This discussion of articles in the magazine, together with hints to teachers and other readers on how to use them, is proving most helpful in Educational Work

In the Sargasso Sea Not even the fantastic tales of monsters, hazards, mysterious islands, legendary banks, and numerous derelicts, supposed to have been drifting for decades on its motionless waters, are so intriguing as the actual facts set forth by Captain Menander concerning the Sargasso Sea. The author devotes several paragraphs to the seaweed which is an inseparable part of the sea. He enumerates certain pelagic animals to be found in its waters, with special attention to the characteristic fauna of the gulfweed, which exactly imitates in its color and markings the yellow color of the weed and the white patches of bryozoa growing upon it, the Sargasso fish which can scarcely be distinguished from the fronds of the weed, the sea-horse so peculiar in appearance and anatomy as to seem a figment of the imagination, the plankton creatures, and the deep sea fishes whose grotesqueness softens our regret for relinquishing belief in "sea monsters." Here, indeed, is truth that is stranger than fiction.

* * *

The Jaguar and the Jungle Interest in that which is foreign and consequently strange is a state of mind which may be observed in many divergent lines of investigation. In the case of animal study the curiosity which is natural regarding animals of distant lands often stimulates more careful and intelligent observaton of the ones at home. The authentic stories herein related of an adventure with a jaguar, of the good nature of the South American cougar, and of the bloody work of the vampire bat whet the appetite for closer familiarity with animals at home and abroad.

* * *

Lighting Facts and Fancies Fires (including forest fires), caused by electric storms, the danger from telegraph lines and telephones at such times, and the toll of human life taken annually by this agency make lightning a practical electric engineering problem, whose solution by means of lightning rods and arresters is far from complete. Up to twenty years ago there was much speculation but little scientific knowledge of the phenomenon. Photography has revealed much regarding it, for instance, the form of a lightning flash, the fact that many flashes are multiple, the distance of a flash and its dimensions. The author explains "black flashes" seen in photographs and "heat lightning," discusses other forms such as "beaded lightning," "rocket lightning" and "ball lightning," and concludes that the real explanation of all lightning must probably be sought in electrical phenomena within the atoms of atmospheric gases.

High school classes in Physics, or General Science classes studying the weather, will find here good supplemental reading, well illustrated.

* * *

The Children's Plover Children of the southwestern United States, if near the beaches, may study the Snowy Plover at first hand. Those living elsewhere should make its acquaintance through this article when studying the sandpipers or plovers of their own neighborhood. The intimate relation of this bird to the sea on whose shores it makes its home, whose sandy beach it has grown to resemble in the protective coloring of its eggs and plumage, and in which it finds both a friend and foe, is a remarkable study in the effect of environment. The pictures complete the study most satisfactorily.

* * *

Wood and Water A stirring plea for the reforestation of the 81,000,000 acres of idle land in our country, which is really capable of producing trees, concludes an account of an "upside-down country where rivers only occasionally appear upon the surface, and then in raging floods," and where "the real tree vegetation begins half way up the mountains and extends to the very summits." The work of the National Forest Service in southern Arizona, the region described, in protecting native vegetation to conserve the water supply, in the careful lumbering of the forests on the mountain tops, and in the practice of forest utilization, offers an example of wise and practical forestry which includes a program for educational recreation as well as for conservation. Southern Arizona is growing as a national playground, and tourists return better citizens for knowing something of our national problems, among which there is none more vital than forest protection. Neither the general reader nor the General Science class studying forestry can afford to miss reading "Wood and Water."

* * *

Insects that go Armed Most persons have a certain disregard for the genuinely dangerous house fly, mosquito, flea, bedbug, and louse, and a correspondingly exaggerated notion of the poisonous quality of other insects, most of which are quite harmless. Though the injury from insects actually poisonous is too slight to the average person to justify fear, their means of defense is interesting as a study in special adaptations. The gas bombs of certain beetles, the stinging organs of the Hymenoptera, the poisonous spines of a few caterpillars, and the piercing mouth parts of the true bugs are described, as well as the appearance and habits of the creatures possessing them, and the best remedies for the wounds inflicted. Grown-ups will profit by this correction of a popular fallacy.

* * *

Cartoons Parents and teachers should seize the opportunity to make use of the cartoons on pages thirty-two and thirty-three. Few means of impressing the lessons of conservation, property rights, and "outdoors good manners" are so telling. Put them up in full view, have a good laugh with the kiddies over them, and then talk them over.

Questions and Answers

The American Nature Association will be glad to answer each month such questions as its members ask about Nature.

QUESTION: *Through ignorance of the field of microscopic work we have come to the end of our resources of study. Can you suggest uses of the microscope for us?*—H. H. S.

ANSWER: There is almost an illimitable field for the microscope. One direction in which it can be used most interestingly is in the examination of feathers and hairs from different birds and animals. No two feathers are constructed alike nor are any two hairs alike. Each human hair differs radically under the microscope. Another interesting endeavor is to follow out changes in frogs, toads and salamander eggs. That field of study alone is engrossing, touching development of cell division. The changing life of any temporary form is full of possibilities for the microscope. The pollen grains of no two flowers are alike and offer use for the microscope.

QUESTION: *I am enclosing a stone with attached little cases. The stone was found at the bottom of a stream. Can you tell me what this is?* (The correspondent sent a small stone on which were several small hollow cases about one-half inch long, encrusted with bits of gravel and about as large around inside as a pencil lead.)

ANSWER: The pupa cases fastened to the stone are those of some species of caddice fly, a class of insects distantly related to the butterflies and moths, and which look something like a moth with lacy wings. Since the cases are empty—the insects probably having emerged last summer—we cannot tell what species inhabited them. They were very likely some species of *Hydropsyche*. These spin a small net which is supposed to catch minute insects as they are swept on by the current. This net is constructed of silk spun by the larval insect, and which it also uses to make its stone-covered case. There are many kinds of these caddice flies and they are sometimes so abundant that they perish in such numbers as to collect on the shores in dense windrows.

QUESTION: *Do you know of any cases where wolves have actually followed and attacked people either in the United States or Canada?*

ANSWER: No accounts of such occurrences have, as far as we know, been substantiated when investigated.

Brand's Peonies

Acres of Beautiful Blooms

The above view of one of the Brand Peony Farms was taken the last week in June, 1924, a week after the National Peony Show at Des Moines, Iowa.

The World's Most Beautiful Peonies

NEVER before in our more than fifty years growing peonies have we had the unusually large assortment of those wonderful choice varieties we are offering for fall planting. Flowers from this stock, competing with those entered by all other growers, won the three highest prizes at the greatest National Peony Show ever held.

Brand's Peonies awarded Gold and Silver Medals at National Peony Show.
Brand's Peonies awarded Grand Sweepstakes at St. Paul Peony Show.
Brand's Peonies awarded American Peony Society Gold Medal at Minneapolis Peony Show.

You will want some of these, the world's choicest and most beautiful peonies, for your fall planting, therefore, write to-day for Brand's FREE catalog of Peonies and Iris, giving varieties with full description, and prices.

BRAND'S BIG PEONY MANUAL, which we consider the most complete and up-to-date work ever written on the Peony, gives the history of that flower, its culture and varieties. Price 35c, but that amount may be deducted from price of your order.

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3 Plants for $4.00

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Each a different color: *Blue*, *Red*, *Pink* or *White*, our selection.

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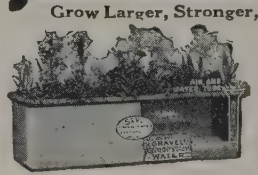

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"Good Turns For Our Forests"

The Boy Scout, juvenile knight of the out-of-doors and woodsman extraordinary, shares honors with the President of the United States and many other notables in the United States Department of Agriculture educational motion picture, "Good Turns for Our Forests." The film is designed to show how the Boy Scouts of America are doing their bit to protect our rapidly shrinking timber supply and to insure the tree crop for the generations of tomorrow by cooperating with the Forest Service in a campaign to stamp out the forest-fire menace. The film story tells of the usefulness of the forests as providers of timber, natural reservoirs of water for power and irrigation, home for the wild, recreation grounds and storehouses of human health. Thrilling forest-fire scenes, made during the progress of destructive fires in western forests, reveal this great menace to our timberlands.

New Hawaiian Forests

On the Island of Oahu, 29,526 acres have been proclaimed by the Governor of Hawaii as additions to the Forest Reserves. These lands were in need of protection and the action was taken after investigations and hearings as reported in the *Hawaiian Forester and Agriculturist,* published by the Commissioners of Agriculture and Forestry of the territory. C. S. Judd is Forester of the territory and the work that he is carrying on there is of more note and significance than most people appreciate.

Yellowstone Elk

An estimated total of 17,242 elk is set for the Yellowstone National Park by the spring count. The actual count showed 7,884 cows, 2,033 calves and 3,031 bulls but 10 per cent added to the count for those not seen makes the estimated number. The north side herd is more numerous while the Gallatin herd includes about 3,000.

Reptile Study Society

Action on the part of the United States Government to assure that serum effective against the bite of a poisonous snake is made available has been asked by the Reptile Study Society through its director, Nellie Louise Condon. The Public Health Service has requested information with respect to the achievements of a noted scientist whose discoveries in this direction have lain fallow for fifteen years. Action soon is contemplated. The movement takes on particular significance in the light of the great movement of the American people toward the out-of-doors, bringing them to places where they may be in danger of poison and where the antidote should be available.

Buildings and Termites

Have you ever noticed in the spring or fall numerous small flying ants coming out of the woodwork of buildings? These are termites or white ants and they mean that the building has not been properly constructed. The United States Bureau of Entomology has urged revision of building regulations to thwart these pests. These revisions should provide against the laying of untreated wood on or in the earth; allowance of at least one inch of concrete between untreated beams and the ground; creosoting of wood going to be placed near the earth; and the discontinuance of the use of lime mortar in brick work in the foundations. The ants are able to penetrate lime mortar after a few years. Insulation of the building by properly treating wood is declared the best insurance of permanence.

Girl Scout Tree Planters

There are some 112,000 Girl Scouts in the United States. During this year each and every one is dedicated to planting at least one tree—a minimum of 112,000 trees. So determined is the program that it is winning adult admiration and support. Many of these trees will be planted on roads of remembrance and as memorials, but elsewhere real forest planting is proposed. For example at Camp Andree, Briarcliff, N. Y., the Girl Scouts are planting trees 1,210 to the acre. On October 31, Founder's Day in the organization, every troop in the United States will plant a tree to the memory of Mrs. Juliette Low, who established the movement in this country.

Humane Trapping

Creation of the Humane Trapping Committee for the conducting of a nation-wide campaign to secure more humane methods of capturing fur-bearing animals, is announced by the American Humane Association. William K. Horton, president of the Association, states that it is hoped to secure the cooperation of the fur industry in this endeavor, which is in no sense an attack upon this industry or upon the wearing of furs. The campaign will be directed to the arousing of public sentiment to the end that legislation requiring humane trapping may be enacted.

A Freak Moose Skull

An exhibit in the Yellowstone Park Museum that has attracted considerable attention is the skull of a moose with attached pair of horns, one of which has a strong resemblance to that of an elk, the flat web-like end being missing. Many visitors have conjectured that the animal was a cross between a moose and an elk, but this cross never occurs in nature and is probably impossible. A closer examination of the elk-like horn shows one point to be bent out of shape, due very likely to some injury sustained in a fall while the horn was still "in the velvet" and young and sensitive. This injury seems to have checked the normal growth, permitting the skeleton of the horn to develop but preventing the filling in of the web between the points. A normal moose skull, with both horns fully developed, has been hung with this freak skull for comparison.

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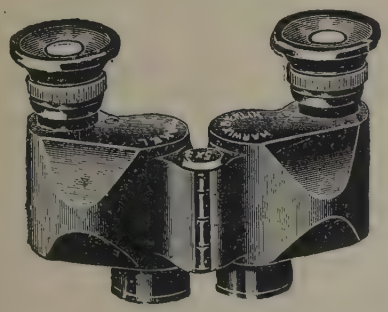

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Houston Nature Club

One of the livest Nature clubs is the Outdoor Nature Club of Houston, Texas, which has now entered upon its third year of healthy growth and activity. Through its monthly mimeographed publication, *The Zephyr,* the club has been able to gain much publicity for Nature as well as the organization work. Tree-planting, holly protection, saving of insectivorous birds are only three of the varied activities of the club. Observation trips have been periodically held, and the club has provided Houston with a common meeting place for outdoor lovers. As *The Zephyr* put it, "the club's membership is composed of men and women of many different vocations and of various religious and political convictions, but all meet on the common ground of appreciation of Nature's beauties and benefits and a desire to help in the work of conserving them."

Courses at Cornell

In the courses offered in the summer school of the New York state college of agriculture at Cornell University, a wide range of subjects is open to teachers who desire to devote a part of the summer vacation to professional improvement. Those who are interested in outdoor plant-life may get courses in botany, in floriculture, and ornamental horticulture, in nature study, and in forestry. The forestry courses have been scheduled so as not to conflict with nature study and biology, and students who wish to study these departments can easily arrange their hours.

Forestry offers two courses, both given by Prof. Ralph S. Hosmer, head of the department of forestry at Cornell. Both are designed to help teachers who, on the basis of fundamentals in nature study and biology in the lower grades, wish to teach more advanced subjects. The Summer School at Cornell is in session from July 6 to August 14, inclusive.

June Beetle Arrives

At this time of year in Yosemite a large, ten-lined June Beetle flies about the lights at night and crawls about in the tents. To most this is a terrifying "bug," and many are afraid even to touch it. In reality this beetle is harmless. Should the one who finds it stop to study it, he would find many points of interest. The antennae, although somewhat club-shaped, are something like a comb with movable teeth or leaves. The stronger outside wing covers protect the inner trans-

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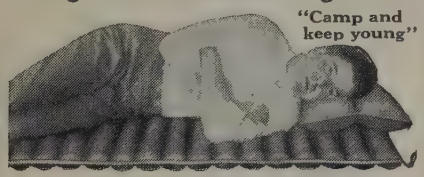

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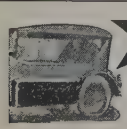

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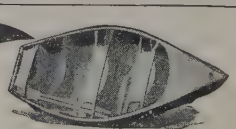

parent wings used in propulsion. This adult beetle develops from a "white grub" or larva that lives in the ground. The famous scarib beetles of the Egyptians are included in the same family. A wise nature study teacher once said, "I feel that a lesson on a spider has been of the right kind if I can teach my pupils to watch it, not squash it." We suggest that the Yosemite visitors take this viewpoint in relation to the common, large June Beetle of the region.

"Board Feet or Bored Timber"

Pinhole borers, wormhole borers, ash borers, pine sawyers, ambrosia beetles, powder post beetles, and other animated gimlets which wreak enormous losses to loggers and lumbermen through their attacks upon cut logs and seasoned timber, are the targets for an attack by the Bureau of Entomology, United States Department of Agriculture in an educational motion picture, "Board Feet or Bored Timber?" This new film includes intimate life studies of these pests and features methods of getting rid of them. The picture was photographed in the cypress swamps of Mississippi and Georgia, the pine forests of South Carolina and the Dismal Swamp of Virginia. Other sections of the film were made in Kentucky and California. It contains photographic material of rare interest. Copies may be borrowed for short periods, or may be purchased at the laboratory charge.

Douglas Fir Disease

As a preparedness measure, Dr. John S. Boyce of the United States Department of Agriculture has gone abroad to England, Scotland and Ireland to study the Douglas Fir canker, a disease that has affected this glorious tree of our West when planted abroad. This fungus has been found in England and the knowledge of its habits is vital to complete protection of the stands in this country. Extensive Douglas Fir planting has taken place in England and on the Continent as a post-war reforestation activity, millions of seeds having been donated by Charles Lathrop Pack, president of the American Tree Association.

Bird Protection

There is no answering the arguments presented in the Bulletin of the Board of Game Commissioners of Pennsylvania outlining "A Year's Program for Bird Protection." The bulletin is prepared by George Miksch Sutton, ornithologist and chief of the

educational section of the board. It deals with the esthetic as well as the economic significance and necessity of birds, is well illustrated and admirably written. The Game Commissioners state in a prefatory note that "while our birds have been protected by law for many years, there is more need for general education as to the reasons for these laws than there is for additional exercise of police power." The bulletin should satisfy this demand for education and it is to be hoped that every bird lover in the state will see to it that citizens not so well informed have an opportunity to read it.

Introducing Alaska

Not that Alaska needs any introduction, but the United States Department of the Interior through the Geological Survey has just gotten out a new base map of the territory that makes numerous additions to and corrections of previous information. Investigations have been lately carried on in the northwestern part of Alaska, providing much new data, and many new names of towns and natural objects, including outlines of the positions of the Mount McKinley National Park and the Katmai National Monument, have been added to the map. It is available for ten cents from the Geological Survey.

A Nature Contest

In memory of his late wife, Elberta Clark Walker, Robert Sparks Walker, an honorary member of the Chattanooga Writers' Club at Lookout Mountain, Tennessee, has endowed the club for an annual fund providing two prizes of $20 and $10 each for Nature poems. The first prize will go for the best Nature poem of not more than 72 lines, not previously published, without restriction. The second prize will be for the best Nature poem by a southern writer living in the south. The conditions of the contest under the Elberta Clark Walker Fund provide that the author's name should not appear on the manuscript but should accompany it separately and that the contest closes on November 1.

Antelope Increase

Conservationists are elated at the news from the Canadian Department of the Interior that the last year has seen an increase from 180 to 235 in the membership of the herd of antelope in the Nemiskam National Park in southeastern Alberta. Nearly extinct, 42 of these antelope were concentrated in 1915. Much doubt was

FISHIN' AND RESTIN'

Fishin' is one thing; restin' is another, but after a big day with rod and reel, a good rest is mighty fittin'. Puts a fellow in fightin' trim for the big day tomorrow.

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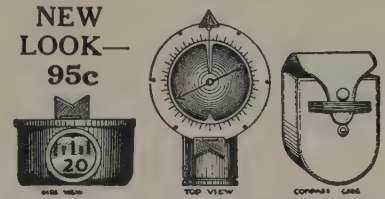

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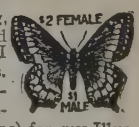

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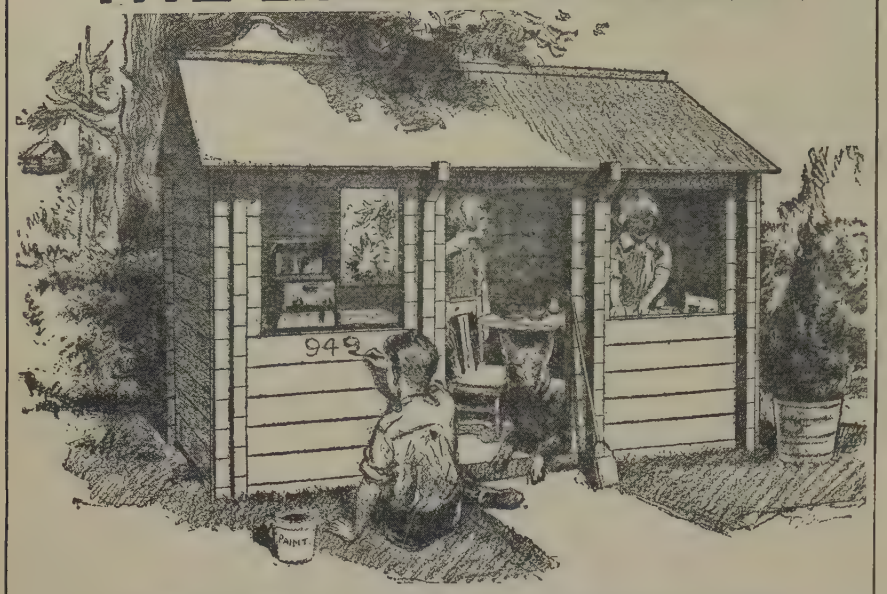

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Mr. Dodson is Famous as the Original Bird House Man

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expressed as to whether they would breed and increase in comparative captivity, and it was felt by many that the antelope would be one of the first species of the big game of North America to become totally extinct. The successful effort at protection and propagation is interesting and significant.

"Ladybug, Ladybug"

Always a harmless little insect and one that we flick from our coat sleeve rather than crush, the Ladybird has won its way to fame. In southern California the mealy bug has been ruinously at work for years in the orange orchards. The Ladybird was found to be a foe to this insect and the well-known bit of verse was changed to "Ladybug, Ladybug, fly to us here." Flocks of the reddish-brown beetles were introduced and they set to work effectively to exterminate the fruit pest, and entomologists say that the Ladybird has now earned a holiday.

"Let's Know Some Trees"

Foresters, conservationists in general, and newspapermen join in profound regret at the passing of Charles H. Shinn. His public service was notable, and among his many pieces of fine work was a little pamphlet entitled "Let's Know Some Trees," containing simple introductions to 70 California trees, written attractively and illustrated. It was Mr. Shinn's wish that every Californian who loves trees and mountains might have a copy of this publication, and the United States Forest Service has published it, making it available through the San Francisco District Office of the Service.

Some Curious Choices

Several of the plants in the Yellowstone seem to have most remarkable preference as to the kind of soil in which they will grow. At the geyser basins, and along the run-off from hot springs elsewhere in the park, the yellow monkey-flower (generally called the false snapdragon) likes to stand with its feet literally in the warm water. It can be found in wet places elsewhere, but it seems to be at its best and thriftiest where the water is a trifle warm. It is a notable thing, however, that this flower is entirely absent from the run-off streams at Mammoth Hot Springs. This is probably due to a chemical preference on the part of the plant, for the waters from most of the springs in the geyser basins is faintly acid, while that from the limestone springs at Mammoth is mildly alkaline.

Cat and Rabbit

Recently the campus at Berea College, Kentucky, was in a mild furor when the temporary adoption of a baby rabbit by a mother cat was discovered, writes Professor John F. Smith. Tabby had taken up residence in a box in a storage room and was, presumably, raising her family according to custom. One day it was discovered that not only were there three kittens, but cuddled down in bed with them was a baby rabbit. For more than a week this congenial companionship, both at meal time and otherwise, prevailed. Then the rabbit disappeared, perhaps feeling the call of the wild and the brier patch.

What Is "Bull" Pine?

Nature guides in our National Parks are often asked the question "What is Bull Pine?" Bull Pine is a term applied in various localities by woodsmen and lumbermen to rather widely different trees. Immature Western Yellow Pines (*Pinus ponderosa*) in which the bark has not yet assumed the alligator-skin-like character of that of the mature trees is usually called by this name. In other localities the Digger Pine (*Pinus sabiniana*) is designated by the name of Bull Pine, while in still other localities the term is applied to the Bishop Pine (*Pinus muricata*). In other cases the term is apparently applied to any pine lumber of inferior quality.

Fighting Forest Insects

A combined offensive against the insects that destroy forest trees is under way in New England and New York. Enlisted in the battle are the Northeastern Forest Experiment Station of the Forest Service; the Bureau of Entomology and the Bureau of Plant Industry of the Department of Agriculture; the State Forest Services; the Forestry Colleges and private individuals, some of whom have contributed to finance the war. The pine weevil, the larch sawfly and, as always, the chestnut blight are the enemies. It is reported that there will be no quarter allowed the enemy and the rules of civilized warfare will be disregarded if necessary.

The Cornell Forester

"We need to intensify the process of educating public opinion as to the present and prospective timber situation in America and the requirements of an adequate forest policy for the nation; and with this must go greater

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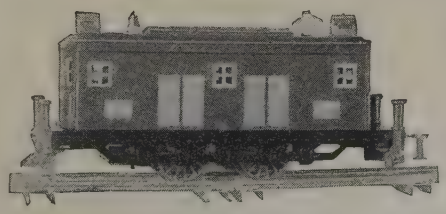

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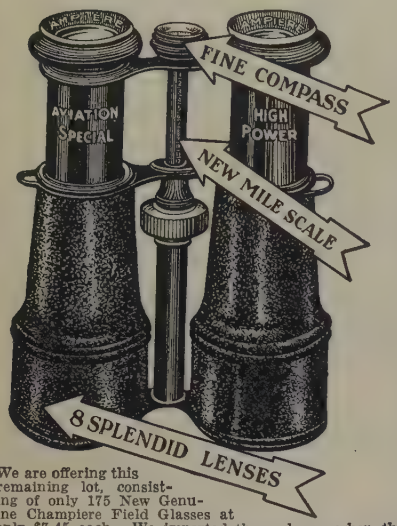

We are offering this remaining lot, consisting of only 175 New Genuine Champiere Field Glasses at only $7.45 each. We imported these glasses when the rate of exchange was lowest. Take advantage of this offer. Order one of these glasses while stock is still on hand.

The Champiere Field Glasses are known the world over for their unusually powerful lenses and mechanical perfection. People and objects miles away seem as if they were close by. Wonderful at prize fights, ball games, boat races, horse races, aboard ship, on hikes, and auto trips. Sold in stores from $18 to $21.

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support for forestry research, on which the progressive development of our forests will depend," declares Dr. Albert R. Mann, Dean of the New York State College of Agriculture at Cornell University, writing in the *Cornell Forester*. The 1925 edition of this book is most attractively done and the several articles that it contains are interesting and forceful presentations of various forestry problems. Prof. Ralph S. Hosmer, head of the School of Forestry, outlines the qualifications that make a forester, emphasizing particularly that "Forestry is a profession that trains men to be leaders."

California's Elms

Both as shade trees and as protectors against wind damage to orchards, the elms of California have long been a favored tree. Their beauty cannot be excelled. Now comes an enemy in the form of the European Elm Leaf Beetle, says T. D. Urbahns, Entomologist of the State Department of Agriculture. This beetle spreads rapidly and the only discovered remedy thus far is costly spraying. The pests spend the winter under rough bark, trash, or in buildings, and in the spring they set disastrously to work. The State Forester recommends future planting of trees more resistant to pests.

An Alabama Volume

"Some Birds, Game and Fish of Alabama," is the title of a compiled and attractively printed volume brought out by the state for its Department of Game and Fisheries. This book contains much republication of material applicable to Alabama's resources, and is dedicated to the use of the schools by I. T. Quinn, the Commissioner of the Department. It carries the endorsement of the State Superintendent of Education and should be of notable value in aiding conservation and Nature instruction in the schools.

Fire Regulation

Fine, imprisonment, or both, faces the citizen who is found guilty of "the throwing or placing of a burning cigarette, cigar, match, pipe heel, firecracker or any ignited substance or the discharge of any kind of fireworks in any place where it may start a fire" in the National Forests. Under the authority vested in him by Congress, Secretary of Agriculture Jardine has issued this regulation, and the maximum penalty is $500 fine or twelve months behind the bars.

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Miner and the Swans

In an attractive little booklet written by Margaret Wade and published with the compliments of Howard C. Wade, president of the United States Mortgage Bond Co., Ltd., of Detroit, is found a fascinating story of wild life conservation. It concerns the wild swan and is specifically the story of how Jack Miner, obtained six swans doomed to die at Niagara Falls, and established them at his home at Kingsville, Ontario, on the shores of Lake Erie. Since then many have been observed in migration near the same place, and the numbers of the race seem on the increase.

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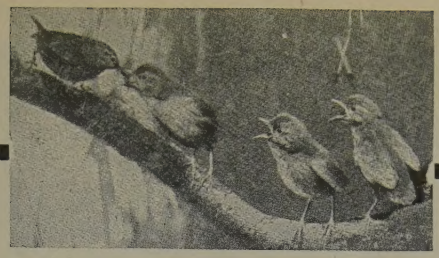

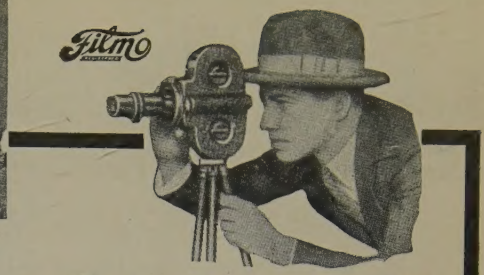

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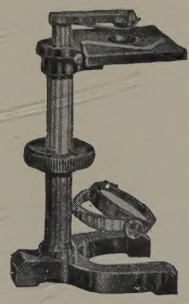

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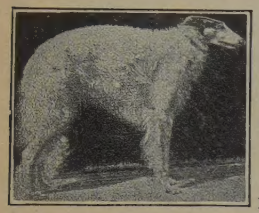

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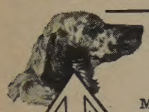

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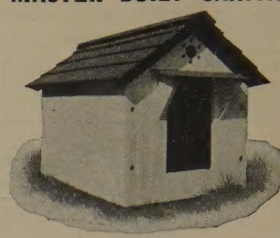

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THE TREE-PLANTING ARMY

Girl Scouts of the Country to Join Tree-planting Army on Founders Day, October 31

Announcement is made by Mrs. Jane D. Rippin, National Director of the Girl Scouts, that the members of that organization will all join the Tree-planting Army this fall. The program is under the direction of Warren Loyster, a forester. Much planting has been done by the Girl Scouts at Camp Andree in Briarcliff. On October 31, Founder's Day for the Girl Scouts, every troop in the United States will plant a tree in honor of Mrs. Juliette Low, who established the movement in this country.

The Bowen High School Garden Club of Chicago has joined the Tree-planting Army and has registered its trees with the American Tree Association.

At least one tree for every club registered with the American Tree Association is the slogan of the members of the Michigan State Federation of Women's Clubs. The work is being directed by Austa M. Cox. Application has been made for three hundred members in the Tree-planting Army by Mrs. A. F. Bruske, Ypsilanti. The work is being done through the New Lincoln Consolidated Rural Schools.

One hundred tree planters have registered with the American Tree Association from Grand Rapids, Mich., at the direction of F. L. Du Mond, Curator of Education, Kent Scientific Museum.

The Civic Club of Yardley, Pa., has joined the Tree-planting Army in a body.

The graduating class of the Junior High School, West Springfield, Mass., has joined the Tree-planting Army.

Sixteen more Boy Scouts have registered their tree planting from Lima, Ohio. This is a continuation of the work being conducted by Joseph M. Butcher, the Scout Executive.

The first Boys and Girls Forestry Club in the state of Pennsylvania has joined the American Tree Association following the tree planting directed by Brandon Wright. The name is the Loyalsock Forestry Club.

The National First Aid Association, which has been registering many tree plantings in honor of Clara Barton, will now push memorial tree planting in honor of Lieut. Gen. Nelson A. Miles. Memorial forests have been set aside for Clara Barton in the state of New York, and the state legislature of Oklahoma has adopted a resolution urging memorial tree planting on behalf of Clara Barton.

The Tree-planting Army is spreading throughout the world. One of the latest requests for information comes from the Teacher's College of Sydney, New South Wales, Australia. Miss Margaret Deer, one of the teachers, asks for information in order to organize a branch of the Tree-planting Army in that country.

Daughters of the American Revolution at Johnstown, Pa., planted two hundred and forty-seven red maples on the highway from Johnstown to Ligonier. The same organization planted a permanent Christmas tree on the public square at Johnstown. The Boy Scouts of that city have planted nine hundred trees on the watershed near that city. In Erie the Civic Department of the Woman's Club has planted one hundred and one memorial trees on the new road to the Government Park, according to the report made by Miss Florence Dibert, of Johnstown.

More than one hundred registrations have been received in the Tree-planting Army from the Stanton, Mich., Forestry Association. These registrations were made under the direction of John W. S. Pierson, the president.

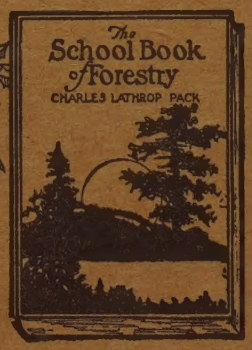
The Campfire Girls have taken up the tree-planting idea and one of the most recent registrations is that of the camp at Marianna, Ark., where Genevieve Morris directed the work.

At the district convention of the California Federation of Women's Clubs, forestry had a big part in the program under the direction of Mrs. Robert Fisher. Organizations such as the Women's Clubs are studying the Town Forest plan, and the American Tree Association has ready for distribution the Town Forest booklet that goes into every phase of the subject. This booklet is by Harris A. Reynolds of the Massachusetts Forestry Association.

Mrs. John Shuttleworth, Shreveport, La., through the division of education, is sending the association's tree-planting instructions and forestry material to members of the woman's club in that state.

The only way to join The American Tree Association is to plant a tree and register it with the Association, 1214 Sixteenth Street N.W., Washington, D. C. The Association will send tree-planting suggestions and a tree-day program for two cents to pay postage.

Make These Additions To Your Nature Library



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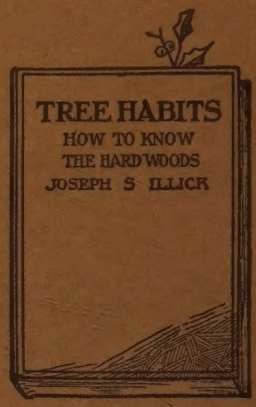

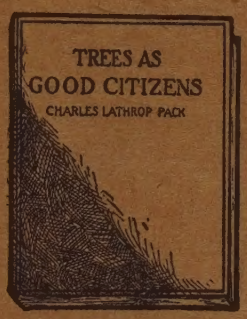

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